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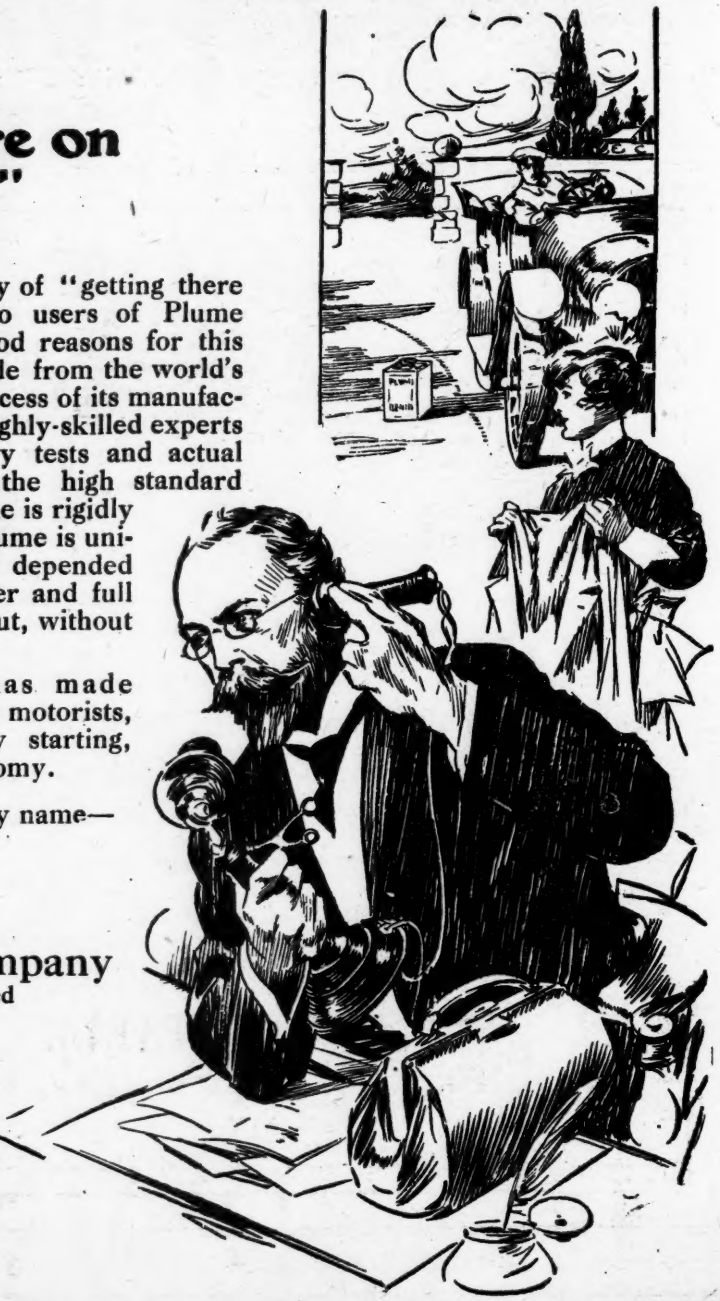

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THE MEDICAL JOURNAL OF AUSTRALIA.

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LABYRINTHINE COMPLICATIONS IN MIDDLE EAR SUPPURATIONS.[1]

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During the last decade so much valuable work has been accomplished in connexion with labyrinthine suppurations and the whole subject has been so exhaustively dealt with and brought up to date in all recent text books on otology, that it will be necessary only for the purpose of this paper to treat the subject as concisely as possible in order to invite a discussion on some points regarding which there are still considerable differences of opinion. I refer in this regard particularly to the indications for operation and the operation which it would be advisable to adopt in each particular case.

Even in this paper I cannot allow the occasion to pass without some reference to the epoch making work of Robert Bárány of Vienna, under whom it was my good fortune to receive tuition in this fascinating subject, in 1909.

It must be admitted that for our knowledge of the symptomatology of labyrinthine suppurations and the value of elicited nystagmus as a diagnostic factor in these conditions, we are indebted to the Viennese school. Stimulated by the observations and the explanations offered of certain varieties of eye movements by the earlier pioneers, Purkinje, Flourens, Mach, Breuer, Crum-Brown and others, by the experimental work on the semi-circular canals of pigeons by Ewald and Hoegyes and lastly by the epoch making work of Jansen on labyrinthine surgery and the publications of his classical cases at the Moscow Congress in 1897, the Viennese school with Bárány, Alexander and Neumann set to work to investigate the functions of the vestibular apparatus in health and disease.

Bárány was the first in the field to record these researches in a monograph in 1907, and we must regard his work, and that of his *confrères*, as representing the most valuable contribution to our literature within recent years.

The value of spontaneous nystagmus as a diagnostic factor in labyrinthine suppurations prior to Bárány's work was not yet known or understood, consequently it was not taken into account by any of the earlier observers, but was merely referred to by the majority in their cases along with other symptoms such as vertigo, tinnitus, nausea, vomiting and disturbance of equilibrium. The lack of this knowledge led to the opening up of many labyrinths with a high percentage of mortality, when more conservative measures should have been adopted, while again, in many instances, cases of meningitis of labyrinthine origin were operated on, alas too late, when a timely labyrinthectomy and efficient drainage would have probably saved the life of the patient.

The advent of the "Prophet of Nystagmus," Robert Bárány, and the publication of his researches in 1907 created a wave of enthusiasm in the world of otology, again centralizing attention on labyrinthine diseases and stimulating fresh research under the new conditions of investigation, diagnosis and treatment. British, American and continental schools at once took the matter up and valuable contributions on labyrinthine diseases appeared from time to time in our journals. Bárány's work became well known to us, particularly by an exhaustive discussion on labyrinthine disease, introduced by himself at the British Medical Association meeting held in London, in 1910, and at the Ninth International Otology Congress in 1912.

The result has been that during the last few years our clinical knowledge of nystagmus has been advanced to a considerable degree, and we find ourselves in a happier position to-day in that we have at our disposal certain recognized methods of eliciting rhythmic nystagmus of labyrinthine origin, which are of paramount importance for investigating the function of the vestibular apparatus in health and disease. These methods are based upon the fact that the vestibular apparatus may be stimulated by caloric and galvanic reaction, by air compression or air rarefaction in the external auditory meatus, and by rotation. We would regard a normal response to stimulation as indicating a functional labyrinth and an abnormal response or a failure to respond as indicative of a partial or complete disorganization of the labyrinth.

The life of the patient may depend upon an accurate investigation of the functions of the labyrinth and therefore it is our duty to be ever on the alert for symptoms of labyrinthine involvement during the course of all suppurations of the middle ear, especially in acute cases with a high degree of virulence and in chronic cases accompanied by cholesteotoma, polypus formation and tuberculosis. A suppurating labyrinth may not only impair or destroy the function of the vestibular apparatus, but it may be the means of introducing infection into the cranial fossæ.

For the investigation of a labyrinthine suppuration, an exact functional examination is imperative and a diagnosis can be arrived at only by taking into consideration the objective results of the functional examination in conjunction with the symptom complex and the anatomical findings during the performance of the radical mastoid operation.

We rely upon a definite diagnosis in order that by a timely and judicious surgical interference we may be able not only to cut short and remove the morbid condition, but also to preserve to some degree the functional integrity of the labyrinth and to guard against the onset of a dreaded intracranial complication.

Labyrinthine Suppuration.

Labyrinthine suppuration is due to an invasion of the internal ear by infective micro-organisms during an acute or chronic suppuration of the middle ear

[1] Being a paper read at the Congress on Diseases of the Eye, Ear, Nose and Throat at Melbourne on November 1, 1918.

spaces. It is rare as a result of acute *otitis media*, but is more frequently met with in cases occurring as a complication of scarlet fever, diphtheria or measles. Only on one occasion during the last 10 years have I seen a case of suppurative labyrinthitis as a complication of scarlet fever. This was in a girl, aged 12, and death from meningitis resulted within one week of the invasion of the labyrinth. Much more often labyrinthitis occurs in connexion with chronic *otitis media* and especially in cases accompanied by cholesteotoma, polypus formation on the inner tympanic wall and tuberculosis.

The frequency of labyrinthitis subsequent to suppurative diseases of the middle ear and temporal bone is very difficult to arrive at owing to the elusiveness of hospital records, but the following observations might be made.

In 89 cases collected by Hinsberg, labyrinthitis was due to acute *otitis media* in 18 cases and to chronic in 71 cases.

In Whitehead's 691 cases of acute and chronic mastoid disease labyrinthine suppuration was present in 27, or 4%.

In 169 cases of radical mastoid operations performed by Brieger for prophylactic reasons, there were 5 deaths from meningitis and in all 5 cases the meningitis was due to a concealed labyrinthine suppuration.

Messrs. West and Scott give the figures at 10% of their radical mastoids. Robert Bárány, of Vienna, has stated that at the Vienna Clinic 400 labyrinthine operations had been performed in 4 years, during which period they had undertaken 2,600 mastoid operations.

With regard to the frequency in acute *otitis media*, Politzer states that he has only seen 3 cases at his clinic during 4 or 5 years, and Milligan at his Manchester Clinic gives the figure at 1%. This is also in accord with the statements of West and Scott.

In 137 labyrinthine cases recorded by Jansen, 3 occurred with acute *otitis media*.

With regard to cholesteotoma, West, who has given considerable attention to the study of labyrinthine disease, says that 90% of all labyrinthine suppurations are due to an eroding process through the labyrinthine capsule; in Jansen's 137 cases of labyrinthine disease he found cholesteotoma in 71 and tuberculosis in 16.

The pathways of infection to the internal ear are by the *foramen ovale*, the *foramen rotundum*, the semi-circular canals and the promontory. The usual pathway when labyrinthitis occurs during an acute *otitis media* is through the oval window, but in chronic middle ear disease the entrance is through the archway of the external semi-circular canal, in the great majority of cases.

In Hinsberg's collection of 198 cases he traced the pathway in 61 cases.

Horizontal canal	27
Fistula of the oval window	17
Fistula of the promontory	7
Fistula in posterior or superior canal	5
Foramen ovale and rotundum	3
Fenestra rotundum	3

Defects in the horizontal canal appear to be present in 1% of chronic middle ear suppuration.

Messrs. West and Scott in their 26 cases found fistula of the external canal in 15 cases, fistula of the promontory in 6, fistula of the round window in 7.

Labyrinthitis occurring in connexion with acute *otitis media* may be ushered in as an acute condition and afterwards assume a chronic form, or *vice versâ;* occurring in connexion with chronic *otitis media* it may begin as an acute process and eventually become chronic, or again it may begin as a chronic latent labyrinthitis and exacerbate as an acute process.

Labyrinthitis may be divided up in many ways. For instance, it may be acute, sub-acute, or chronic; diffuse or circumscribed; latent or manifest; also serous or purulent. Thus, we may have a combination of these, such as acute diffuse purulent manifest labyrinthitis; sub-acute diffuse purulent manifest labyrinthitis; acute diffuse serous manifest labyrinthitis; diffuse purulent latent labyrinthitis; acute purulent manifest circumscribed labyrinthitis; chronic or latent purulent circumscribed labyrinthitis, but clinically, for the sake of simplicity, we may consider four grades:—

(*i.*) Diffuse purulent manifest labyrinthitis; sub-acute labyrinthitis.
(*ii.*) Diffuse purulent latent labyrinthitis.
(*iii.*) Circumscribed labyrinthitis.
(*iv.*) Diffuse serous labyrinthitis, induced and secondary.

Acute labyrinthitis occurring in connexion with (1) acute or chronic middle ear suppuration, (2) an exacerbation of a chronic condition, (3) a sudden rupture of pus into the labyrinth in circumscribed lesions with fistula, (4) traumatic injury to the labyrinthine capsule during the performance of a radical operation, intentionally or otherwise, by forcible extraction of polypus or foreign body, or careless paracentesis, will present in all these instances symptoms of an acute purulent infection of the vestibular apparatus.

Symptoms.

(*i.*) In diffuse purulent manifest labyrinthitis the aspect of the patient is that of one suffering from an acute illness and the clinical picture is characterized by symptoms referable to a severe disturbance of the vestibular apparatus. Thus there will be intense vertigo, nausea and vomiting, nystagmus and disturbance of equilibrium. The temperature may be slightly raised and the pulse will be frequent and rapid. He will also complain of some headache or pain on the diseased side. Tinnitus is usually present and often very severe, while deafness may be absolute. The patient will have taken to bed, and it will be noticed that he lies with the head turned well over to one side with the healthy ear resting on the pillow. This is characteristic. He complains of violent giddiness with apparent turning of all surrounding objects towards the healthy side and with eyes shut an apparent turning of his own body also to the healthy side.

If the patient could be induced to stand up to test for Rombergism, it would be found that the falling is towards the diseased side, that it is a contrary direction to the quick component of nystagmus.

Turning the head round 90° either to the left or right, the falling will be either forward or backward according to the nystagmus. That is in these cases the falling is towards the diseased side.

There will be violent spontaneous rotatory and horizontal nystagmus which is intensified by attentive deviation of the eyes to the healthy side, and diminished in intensity on deviation towards the diseased side.

Caloric reaction in the diseased ear is negative, but cold water to the healthy ear arrests the nystagmus to that side and gives a rotatory nystagmus to the diseased side.

Turning reactions should never be attempted in these cases.

The effect of air compression and rarefaction in the external meatus of the diseased side is negative, also galvanic reaction.

Deafness may not be absolute at the onset of the disease, but in a very short time, within two days, it will be so. Deafness is greater than can be accounted for by the middle ear affection.

After the first two or three days the symptoms gradually decline and eventually disappear. The vertigo, tinnitus and nystagmus are the first to disappear, while deafness and disturbance of equilibrium remain, fever and headache decline with the disappearance of symptoms, unless kept up by other conditions altogether outside the labyrinth, such as acute otitis, retention of pus in the mastoid spaces, infection of the lateral sinus, or meningitis. On the gradual decline of all symptoms the case drifts into one of sub-acute labyrinthitis which may now be briefly considered.

Sub-Acute Labyrinthitis.

This condition is seen within a week or ten days of the patient running the gauntlet of the acute attack.

The symptoms are sub-acute and declining. The patient is more comfortable and lies in bed in a normal manner. Slight dizziness only may be complained of and surrounding objects no longer appear to move, nor his own body, with eyes shut. Disturbance of equilibrium is weak or absent, but the patient is found to be totally deaf on the diseased side when tested with Bárány's noise apparatus. The temperature and pulse rate may be only a little raised or normal. Tinnitus may be absent or present.

There may either be a slight spontaneous rotatory nystagmus to the healthy side, or perhaps a slight horizontal nystagmus to the diseased side.

Turning reactions behind opaque glasses will give, by turning 10 times to the diseased side and head erect, nystagmus to the healthy side lasting about 28 seconds; turning 10 times towards the healthy side will give nystagmus to the diseased side lasting about 14 seconds.

Galvanic nystagmus may or may not be present, but would be plainly marked on the sound side.

These sub-acute cases are but a half way phase towards the diffuse latent labyrinthitis.

Diffuse Purulent Latent Labyrinthitis.

As before mentioned this may be the result of an acute condition, or it may be brought about by a gradual extension of infection from the middle ear spaces, that is, it may be chronic from the onset by a slow eroding action of a cholesteotoma or tuberculosis, or pus in old standing cases of chronic *otitis media*.

In diffuse purulent latent labyrinthitis there is absence of all symptoms and one may not be able to obtain any history of previous attacks of vertigo, but on the other hand on close questioning, the patient may remember having had a severe "bilious attack" which kept him in bed perhaps for several days, during which time he was unable to raise his head from the pillow without bringing on violent attacks of giddiness, nausea, or vomiting, with apparent movement of surrounding objects in the room.

In long-standing cases of diffuse purulent latent labyrinthitis infection may lose its virulence and the labyrinthine spaces may become sealed up by connective tissue or new bone. Ruttin has shown that in these defunct non-infective labyrinths, the spaces of which have become filled up by new bony deposits, the rotation tests behave in a peculiar manner, in that the duration of the after-nystagmus to the sound side equals the duration of that to the diseased side, but both are shorter than normal, about 14 seconds to each side (Ruttin's compensation symptom).

When facial paralysis supervenes in the course of a chronic middle ear suppuration and the tests show that the labyrinth is defunct, a purulent latent labyrinthitis can be at once diagnosed. In these cases a necrosis or sequestration of the labyrinthine capsule will have occurred with implication of the nerve; the paralysis of the nerve would be a guide to this condition. In diffuse latent labyrinthitis deafness is absolute, spontaneous nystagmus is absent, but can be elicited only by response to the good ear by caloric, galvanic and turning reactions. Such a case may go on for months or years without giving any trouble and may only be discovered during a radical mastoid operation, or forcible removal of polypi from the inner tympanic wall, when it may light up again as an acute exacerbation or by symptoms of intracranial complications.

Circumscribed Labyrinthitis.

Chronic circumscribed disease of the labyrinth is caused by caries or necrosis of the labyrinthine capsule producing a fistula or death *en masse* of a segment of the bony wall, the result of a prolonged chronic suppurative *otitis media*, or by an eroding action of a cholesteotoma, or by tuberculosis, or as a late sequela in scarlet fever or scarlatinal diphtheritic infection of the middle ear.

In simple circumscribed lesions the caries attack the prominence of the external semi-circular canal which is directly exposed within the aditus.

In the majority of cases the progress of the eroding action of the pus or cholesteotoma is slow and time will be given for a protective barrier to be formed from the membranous canal; the focus of pus will remain localized to the bony wall with an intact labyrinth, but by a more rapid microbic invasion after the formation of a bony fistula, the membranous labyrinth will become involved to a greater or less extent and a segment of the canal will be shut off.

In the more extensive circumscribed lesions caused by cholesteotoma the promontory and canals may become invaded by a slow erosion and time will be given for the shutting off of the morbid condition, the membranous labyrinth being only partly damaged. The bony capsule in such cases is so weak and friable that

it may give way to slight injuries, such as the removal of polypi or during a mastoid operation.

Labyrinthitis from scarlatinal infection may cause necrosis of a portion of the capsule by an interference with its blood supply during the acute stage with the formation of a patch of necrosis more or less extensive in the promontory and canals; this may remain localized with a much impaired membranous labyrinth, but more often, however, the bony capsule is extensively necrosed and thrown off as a sequestrum.

Chronic circumscribed tubercular lesions may be restricted to the cochlea, vestibule or canals, but at a later stage may invade all parts together, resulting in an extensive caries or necrosis of the labyrinthine capsule. The labyrinth is generally destroyed by this slow invasion and pus may be found within, giving rise to an abscess in the middle or cerebellar fossæ.

In all cases of circumscribed labyrinthitis a fistula will be found leading to a normal, an impaired, or destroyed labyrinth. In the great majority of cases, however, the lesions are restricted to the external semi-circular canal and the symptoms will depend upon the extent of the invasion of the membranous labyrinth.

(*a*) *Circumscribed labyrinthitis with intact membranous labyrinth.* The chief symptom of which the patient complains, is giddiness which may be brought about without apparent cause, and which may be intense in some cases, lasting several hours, accompanied by nausea, vomiting, and some disturbance of equilibrium.

Vertigo is brought on by a sudden movement of the head, such as by bending the head suddenly backwards or forwards, or to either side, by bending down or getting up suddenly, by turning quickly in bed, or rising suddenly out of bed. During a sea voyage severe attacks may be brought on by the motion of the vessel.

Between the attacks as a rule he feels well, but nervous or apprehensive lest an attack may at any time come on. He is unsteady when walking in the dark or on climbing, or walking across a plank.

Disturbance of equilibrium will be present during the attacks and the direction of falling will be generally towards the diseased side or towards the healthy side, but this is not constant.

The hearing may be normal or impaired according to the extent of the disease and involvement of the middle ear.

Spontaneous nystagmus may be absent or there may be only a slight rotatory or horizontal degree to the right or left.

Bending the head backwards suddenly an attack of vertigo with rotatory nystagmus to the diseased side may be elicited, while bending the head suddenly towards the diseased side may bring on a strong rotatory nystagmus to that side.

Bending the head suddenly to the healthy side may produce weaker nystagmus to the same side.

It is in these cases that we get a fistula symptom by air compression or rarefaction, which may, when applied to the meatus of the diseased side, produce a coarse rotatory nystagmus. The direction of this nystagmus by compression is contrary to that by rarefaction, but this varies in different cases; it is sometimes towards the diseased side and sometimes towards the healthy side. This is accounted for by the position of the fistula.

(*b*) *In circumscribed labyrinthitis with fistula with reduced irritability.* The functions of the labyrinth will be slightly impaired and the symptoms complained of will be attacks of vertigo, nausea, vomiting and disturbance of equilibrium with staggering towards the diseased side.

The hearing in these cases may be gradually impaired, the deafness being labyrinthine.

Spontaneous nystagmus may be markedly strong, rotatory or horizontal to right or left, but stronger towards the diseased side. Bending the head backwards or forward, or to the right or left will bring on attacks of nystagmus. The fistula symptom will be present.

Caloric, galvanic and turning tests will give typical reactions on the diseased side.

(*c*) *Circumscribed labyrinthitis with fistula and marked loss of irritability.* In these cases there will be attacks of vertigo, nausea, disturbance of equilibrium and considerable loss of function, together with spontaneous nystagmus probably to the sound side only.

Turning reactions will give a weaker response to the diseased side. Fistula symptom may be absent, but, as a rule, there may be just a slow movement of the eyes to the sound side by compression and a similar movement of the eyes to the diseased side by aspiration. A caloric stimulus to the diseased side may elicit a feeble response, but it may be altogether negative.

Galvanic nystagmus may be elicited.

Disturbance of equilibrium may be very marked; when standing with feet together and eyes closed, the patient will probably fall or totter towards the diseased side.

Deafness may be very marked or absolute, but complete deafness to speech is rarely seen; the tuning fork may not be heard by air conduction. "Weber" would be to the sound side and there would be a diminished "Schwabach."

In the more extensive lesions connected with cholesteotoma and tuberculosis, the fistula symptom can only be elicited if the labyrinth is functional. Otoscopic examination may reveal a collection of cholesteotoma or the presence of a diseased inner tympanic wall.

It will be apparent, therefore, that in all these cases of circumscribed lesions with fistula the condition of the labyrinth can only be determined by special functional tests.

Acute Diffuse Serous Labyrinthitis (Induced and Secondary).

It is sometimes found during the course of an acute or chronic middle ear suppuration with an intact labyrinthine capsule that symptoms of labyrinthine disturbance will suddenly supervene. This may be so severe as to compel the patient to take to bed and may lead us perhaps to suspect the onset of a labyrinthine suppuration. Happily though, by careful investigation of the labyrinthine functions, we are, in the majority of cases, able to diagnose the con-

dition as one of less gravity and to place it as a serous exudation within the labyrinthine spaces. This acute serous induced labyrinthitis is set up by a toxæmia. The toxins generated by the bacteria within the middle ear spaces gain entrance through the labyrinthine capsule, most probably through the oval or round window, giving rise to an inflammatory œdema with dilatation of the labyrinthine vessels and a serous exudation within the peri- and endolymph spaces. After a radical mastoid operation which has been performed for the cure of a chronic middle ear suppuration, it not infrequently happens that an induced serous labyrinthitis will supervene. This condition is probably brought about by a traumatic inflammatory reaction occasioned by the operation, resulting in a serous exudation within the labyrinthine spaces. The onset of symptoms generally manifests itself within a few hours after the radical mastoid operation and the symptoms are usually well established by the third day.

During the course of a circumscribed labyrinthitis with fistula, symptoms of an acute labyrinthine disturbance may suddenly arise, resembling closely those in the serous induced type and similar manifestations may also become evident from 12 to 72 hours after a radical mastoid operation for the relief of a circumscribed lesion with fistula. This condition would probably be a diffuse serous secondary labyrinthitis set up by a labyrinthine toxæmia. It will generally be found in these cases that the fistula has penetrated the endosteum to some depth within the labyrinth, and is surrounded by infective granulations. Toxins generated within this fistulous tract pass through and give rise to an inflammatory œdema with subsequent serous exudation within the labyrinthine spaces. In these diffuse serous labyrinthites, but more particularly in the secondary type, there is always the danger of a serous drifting into a purulent labyrinthitis by a transmigration of the bacteria, the serous being but a forerunner of the purulent stage, and the knowledge of this fact should compel us to watch carefully the progress of events and to investigate from time to time the function of the labyrinth in order to determine with as little delay as possible the exact condition present, whether serous or purulent, for upon this would be based our indications for treatment, operative or otherwise.

In both the diffuse serous induced and secondary labyrinthites, the symptoms are identical to those of a diffuse purulent labyrinthitis, that is, there will be marked or total deafness in the affected ear, severe vertigo, nausea, vomiting and disturbance of equilibrium with spontaneous rotatory and horizontal nystagmus towards the sound side. The patient will be obliged to take to bed and it will be found that he shows preference to lie on the pillow with head turned well over towards the sound side, the characteristic position in all acute serous and purulent conditions with severe vertigo. As before-mentioned the symptoms in all these acute serous conditions become fully established by about the third day and it is as this period that most careful and painstaking investigation of the function of the labyrinth should be undertaken. Hearing may be greatly impaired or deafness may be absolute, the vestibular tests, galvanic, caloric and fistula, may be positive or negative, that is, there may be complete deafness, yet a response to one or more of these tests, or on the other hand some degree of hearing may be present and yet the static labyrinth may not respond to stimulation, but in more favourable cases the hearing may be only a little changed and the static labyrinth may be responsive to one or all the tests. It may be said that as long as even a remnant of function, either cochlear or vestibular, is present as determined by a careful investigation, we must in every case consider the condition to be due to a serous involvement only, but on the other hand when we find that total deafness has supervened and the static labyrinth no longer responds to stimulation, we are bound to look upon the case as a purulent one and treat it as such. The tendency is for these acute diffuse serous labyrinthites to clear up within a week or ten days, either with restored function or partial loss of function, particularly cochlear, or to drift during the height of symptoms into a purulent stage with complete loss of function. In recognition of the fact that the functional tests are the only means at our disposal for investigating the condition of the labyrinth in order to differentiate between a serous and purulent labyrinthitis, we should consider it our duty to apply these tests in every case of chronic middle ear suppuration and circumscribed labyrinthitis with fistula demanding a radical mastoid operation, or whenever after operation labyrinthine symptoms supervene.

Diagnosis.

The diagnosis of labyrinthine suppuration is in the main a difficult problem and this is especially the case in the acute form. It must be remembered that striking labyrinthine symptoms may be associated with conditions in the middle ear spaces, such as may be met with in acute *otitis media* before paracentesis or spontaneous rupture of the membrane. I have seen such cases in children where there were severe symptoms of labyrinthine suppuration, nystagmus, nausea and vomiting, with a high temperature and rapid pulse, which entirely disappeared in a few hours after paracentesis. The pressure of a cholesteotoma in the middle ear spaces may also give rise to such labyrinthine symptoms which will quickly subside on removal of the offending mass. On relieving the condition of the middle ear spaces, the labyrinthine symptoms should disappear at once, whereas if the inflammation is confined to the internal ear, the symptoms will remain for a time at least and we would have to be on our guard for a serous induced or purulent labyrinthitis which can be diagnosed only by careful functional examination.

A slight rise in temperature is usual in acute cases and can be taken into account only by exclusion. In one of my cases with marked labyrinthine symptoms, the temperature and symptoms subsided after a radical operation and the uncapping of the sinus. A sudden rise in temperature, when conditions in the middle ear spaces have been excluded, would point in all probability to a meningeal infection. This would be all the more probable if severe headache with retraction of the head and other symptoms were present. In such cases lumbar puncture should be performed at

once for a cytological examination of the cerebrospinal fluid.

Deafness as a diagnostic symptom cannot be relied on unless the case has come under the notice of the surgeon at the beginning of the attack, because in acute cases deafness may become complete within a few hours.

Vertigo is a most important symptom. In the acute cases it is as a rule severe and accompanied by nausea, vomiting and disturbance of equilibrium. The patient in bed with eyes shut would have the sensation of being turned in direction towards the sound side and with eyes open all surrounding objects moving in the same direction. In these acute cases it is the tendency for all symptoms to subside gradually and after a time to disappear entirely, the case drifting into one of latent labyrinthitis, in which perhaps slight attacks of giddiness may persist for a time, and in which disturbance of equilibrium can only be clearly demonstrated by certain tests (Romberg and von Stein's tests).

Vomiting is usually present and severe in acute cases of labyrinthitis and in proportion to the severity of the vertigo. In latent cases it may be absent, but may come on again during an acute exacerbation.

Diffuse latent labyrinthitis can be diagnosed only by the objective results of functional examination, taken in conjunction with the history of a former attack of severe vertigo, nausea and vomiting and disturbance of equilibrium. Deafness in these cases is absolute. These diffuse latent cases may be overlooked on account of absence of symptoms prior to a radical mastoid operation, which procedure may bring about an acute exacerbation of the chronic condition.

Circumscribed Labyrinthitis.

It is a clinical fact of importance that circumscribed lesions, even of considerable areas, may remain localized to a segment of the labyrinthine capsule; the progress of formation of these carious necrotic areas may have been so gradual that sufficient time has been given for the formation of a protective barrier and the collection of pus will be circumscribed to the bony wall. In such cases there may be only a partial loss of function. The condition is unrecognized beforehand; when found during the performance of a radical mastoid operation, it might lead us to suspect a total destruction of the labyrinth and induce us to perform a labyrinthine operation which would be unjustifiable.

Circumscribed lesions, with fistula penetrating within the peri and endolymph spaces and surrounded by granulation tissue, might give rise to acute diffuse secondary labyrinthitis which can be diagnosed only by a history of sudden onset of symptoms and by careful functional testing. These acute serous labyrinthites are particularly prone to develope into a purulent form by a transmigration of bacteria from the fistulous tract into the labyrinthine spaces resulting in acute diffuse purulent labyrinthitis.

There are other conditions in connexion with chronic circumscribed lesions in which the labyrinth is invaded by a slow but progressive crumbling away of the bony wall without the formation of a protective barrier, but still with an intact labyrinth. Such cases might give rise to polypus formation; it is highly important that it should be diagnosed, for it is just this class of case that may exacerbate into an acute suppurative labyrinthitis from slight injuries, such as the removal of a polypus, or during a mastoid operation. The symptom complex here is more pronounced and there may be a slight rise in temperature.

I hold that it is of much importance before the removal of polypi generally that the condition of the inner tympanic wall should in every case be thoroughly examined by very gentle probing to determine, if possible, the position and attachment of the polypus and the presence or otherwise of a carious patch and also by air compression and rarefaction for a fistula sign.

It is highly probable that in all these cases of labyrinthine suppuration the invasion of the labyrinth is by means of a fistulous tract, even one of the smallest dimensions. It must be emphasized that the severity of labyrinthine symptoms bears no relation to the extent of the disease, for a very small area situated in the horizontal canal may give rise to severe symptoms and confine the patient to bed, while on the other hand large carious areas with considerable damage to the labyrinth may cause only slight symptoms of labyrinthine disturbance and the patient may complain only of deafness and of a discharging ear.

The diagnosis of cholesteotoma and tubercular invasion of the labyrinth can only be determined by taking into consideration the history of the case, the otoscopic findings, the symptom complex and the objective result of a functional examination.

It is important from a diagnostic point of view that facial paralysis coming on during the course of a chronic middle ear suppuration may indicate a labyrinthine lesion, the nerve being implicated either in the tympanic wall or in its passage through the *pars petrosa*, before it has reached the tympanic cavity.

Course and Prognosis.

It may be said that the milder the onset of labyrinthine suppuration and the more chronic the progress, the better the prognosis.

Acute labyrinthine symptoms coming on during the course of an acute *otitis media* or by pressure of a cholesteotoma may clear up in a very few hours when the middle ear spaces are relieved.

Acute diffuse purulent labyrinthitis without intracranial complications may drift into a latent state with a defunct labyrinth and total deafness, or on the other hand may infect the cranial fossæ at once. Therefore the prognosis is unfavourable as regards the labyrinth on the one hand and the life of the patient on the other.

The hyper-acute purulent labyrinthitis, secondary to chronic middle ear disease, especially in those cases where there is a fistula through the promontory wall, is the most dangerous, for it is in these cases that meningitis is prone to occur.

In scarlet fever also an acute diffuse suppurative labyrinthitis, supervening as a complication of this disease, is particularly dangerous. The infection is so virulent and rapid that meningitis, in the great majority of cases, sets in with fatal results, or, failing this, the infection may bring about the destruction of the soft tissues within the labyrinth, resulting in thrombosis and destruction of the labyrinthine vessels

with necrosis or sequestration of the labyrinthine capsule.

In circumscribed lesions with or without fistula the prognosis is favourable after the mastoid operation; complete healing will usually take place without loss of function; but in circumscribed lesions with fistula in which the function of the labyrinth is already impaired, the healing of the fistula will probably result after a radical mastoid operation, but the hearing may gradually become destroyed.

A discharging fistula after the mastoid operation is unfavourable, for these cases are very liable at any time to infect the labyrinth, giving rise to a serous or purulent labyrinthitis, which may demand a further operation.

Diffuse latent labyrinthitis may in time lose its infectivity and the labyrinth become obliterated by connective tissue and perhaps eventually by bone, its function being entirely destroyed. More often though, it is a source of danger in view of a possible intracranial infection by an exacerbation of the chronic condition.

Prognosis is unfavourable with cholesteotoma especially in those cases where it has invaded the promontory and canals, such a condition would necessitate the opening up of the labyrinth and the removal of the mass; thus the functions of the labyrinth would be destroyed. There is a particular danger in these cases of an infective meningitis.

Tuberculous disease of the labyrinth is the most unfavourable of all and the hope of cure is remote. The disease attacks extensive areas in the promontory and cochlea producing necrosis of the bony wall and invading the labyrinth. Even if the patient survives the labyrinthine operation, he will probably succumb to either tubercular meningitis or general tuberculosis.

In all cases of acute and chronic labyrinthitis accompanied by intracranial complication, the prognoses are unfavourable. Meningitis from acute suppurative labyrinthitis secondary to chronic middle ear disease is the most unfavourable.

Traumatic labyrinthitis supervening after an injury to the labyrinthine capsule by luxation of the *stapes* during a radical mastoid operation, by careless paracentesis or extraction of a foreign body and by fracture of the skull involving the labyrinth, is favourable as regards life, if the labyrinth is immediately opened up and drained.

Indications for Operation.

The treatment of labyrinthine suppuration is operative (a radical mastoid or a combined radical and labyrinthine operation).

According to Politzer the opening up of a diffusely diseased labyrinth is not accompanied by any great risk.

Freytag gives the mortality at 4%. This is substantiated by statistics from the Vienna School where 400 labyrinthine operations had been performed within 4 years with a mortality of less than 4%. All observers are now of the same opinion.

A radical mastoid operation is imperative in every case of labyrinthine suppuration; any further procedure will depend upon the anatomical findings on the inner tympanic wall during the performance of the radical operation and the functional testing prior to this.

In considering indications for operation we must take into account the following:—

(*i.*) The symptom-complex causing the labyrinthine trouble.
(*ii.*) The character of the disease.
(*iii.*) The direct or indirect anatomical findings on the inner tympanic wall before and the area involved during the mastoid operation.
(*iv.*) The tendency of extension to or the presence of signs of intracranial complication.

Indications for operations may be considered under the following headings:—

(*a*) Acute diffuse labyrinthitis, serous and purulent;
(*b*) latent diffuse purulent labyrinthitis;
(*c*) circumscribed labyrinthitis.

In acute suppuration of the labyrinth the pus is retained in cavities of small dimensions from which it cannot escape. It is possible in exceptional cases for the condition to cure itself. A barrier will be formed against the cranial fossæ, the infection will lose ts virulence, the exudate will become organized and the cavity obliterated by connective tissue, or later by bone.

But this spontaneous healing is the exception. Much more often the acute condition speedily invades the cranial cavities, giving rise to meningitis or cerebellar abscess, or a combination of these two. Consequently in these acute suppurative diseases we are not justified in waiting for a more favourable result, but should resort to surgical interference at once.

Labyrinthine symptoms arising during the course of an acute suppurative *otitis media* may subside after a few hours by paracentesis, or after a simple mastoid operation. Should this not be the case and symptoms continue with vertigo, nausea, or vomiting and nystagmus towards the sound side lasting for 24 hours, we must then look upon the condition as being either a diffuse serous induced, or a diffuse purulent labyrinthitis. The serous labyrinthitis as a rule subsides within ten days and operative interference is unnecessary, but, if by careful functional testing, it can be determined that the condition is a purulent one, following on a serous exudation or purulent from the onset, it is necessary to drain the labyrinth at once by double vestibulotomy (Hinsberg).

Acute diffuse purulent labyrinthitis complicating scarlet fever demands an immediate labyrinthectomy by Neumann's method in order, if possible, to cut off infection from the meninges. The infection is so virulent and rapid that in these cases meningitis is most prone to supervene or as a sequela, necrosis or sequestration of the labyrinthine capsule may remain, necessitating ablation of the labyrinth by Neumann's method.

A diffuse serous induced labyrinthitis occurring in the course of a chronic middle ear suppuration with cholesteotoma would indicate a radical mastoid operation only when acute symptoms have passed off, with careful curettage of the middle ear spaces and most conservative treatment of the labyrinthine capsule, particularly in the region of the external semi-circular canal in order to avoid disturbance of a possible small fistula or carious patch. But in the event of the

serous exudation becoming purulent, or if purulent from the onset, drainage of the labyrinth by a double vestibulotomy (Hinsberg) is all that is necessary.

In any of these conditions should meningeal or cerebral symptoms become manifest, an operation (Neumann) is immediately demanded, for thorough drainage of the labyrinth and exposure or exploration of the dura.

The object of operation is for relief of symptoms, the removal of the pus and for cutting short the danger of intracranial complications, also for the avoidance of a residual latent infective labyrinthitis.

In a subacute condition in which the patient is often found, he is no longer acutely ill and already some protection has been formed from the cranial contents, therefore an operation is not immediately indicated and we may be justified in waiting for a time and operating in a latent condition with less risk, by Neumann's method.

Diffuse latent labyrinthitis. If we have a patient in whom investigation shows a latent destruction of the labyrinth and complete deafness, as judged from the history and functional findings, we must undertake the labyrinthine operation whether a fistula or not is found in the labyrinthine capsule at the mastoid operation. In such a case the radical mastoid operation would be inadequate to bring about a cessation of invasion within the labyrinth and would leave the ear in a chronic infected condition. It is just in these cases that post-operative meningitis is likely to occur, unless a labyrinthine operation is performed at the same time as the radical operation by Neumann's method.

In long standing cases in which the functional tests give a positive compensation reaction (Ruttin), a labyrinthine operation is contraindicated, as the labyrinth is dead and non-infective.

Circumscribed labyrinthitis. Nearly all cases of circumscribed lesions are localized in the external semi-circular canal only. The condition may be a simple caries and erosion of the bony wall leading to the periosteal lining of the capsule, but with intact labyrinth, or infection through the fistula may lead to local blocking of a small segment of the canal, the remaining portions of the labyrinth being still functional and capable of preservation. In such cases a radical mastoid operation only is necessary with a conservative treatment of the conditions found on the labyrinthine wall. The fistula on no account should be probed or curetted. Usually the local focus becomes healed and the fistula shut off with an apparent cure, but on the other hand after a radical operation and apparent healing of the fistula the patient may sometime complain of attacks of vertigo and a discharging ear, which prevent him from carrying out his daily duties. In such cases a secondary radical operation is indicated for a careful examination of the capsule in the region of the fistula. Usually a small necrotic area will be revealed and the necrotic bone should be removed with great care in order to protect against injury of the membranous labyrinth.

A chronic circumscribed lesion with fistula threatening to become diffuse will demand a thorough investigation. The diffuse condition may be either serous or purulent and differentiation can be arrived at only by a painstaking functional examination. If, as a result of the examination, a diffuse serous labyrinthitis can be diagnosed without any doubt, a radical mastoid operation only is indicated and this would be performed when all symptoms have subsided, but if it has been found that the serous has drifted into a purulent labyrinthitis, or if the condition is purulent from the onset, then a combined radical and labyrinthine operation must be performed by Neumann's method.

After a radical mastoid operation for the relief of a circumscribed labyrinthitis with fistula, labyrinthine symptoms may supervene within two or three days of the operation. This manifestation would indicate the presence of either a diffuse serous, or a diffuse purulent labyrinthitis. Here again the exact condition can be arrived at only by special functional testing.

If it is found that even a remnant of function remains, either cochlear or vestibular, we do not perform a labyrinthine operation, but if the patient is completely deaf on the operated side and all vestibular tests are negative, then the labyrinth must be opened and drained by Neumann's method, for the condition now is in all probability a diffuse purulent labyrinthitis and must be treated as such.

Masses of cholesteotomata invading the promontory or canals and patches of necrosis originating in old chronic suppurative middle ear diseases or from tuberculosis affecting the cochlea, demand a radical ablation of the labyrinth by Neumann's method on account of the dangers of meningitis or cerebellar abscess which are prone to occur.

The occurrence of facial paralysis in old standing middle ear disease calls for a radical mastoid and the removal of carious or necrotic patches only if the labyrinth is functional. In other conditions of a defunct labyrinth and facial paralysis with implication of the nerve in the *pars petrosa*, an ablation of the labyrinth by Neumann's method is necessary, not for the nerve's sake, which may be irretrievably damaged, but for the patient's sake in view of a probable intracranial infection.

Symptoms of impending meningitis or cerebellar abscess coming on either before or after a radical mastoid operation for the relief of circumscribed lesions indicate an immediate labyrinthine operation by Neumann's method.

Clinical Notes of Six Selected Cases of Unusual Interest.

Sudden Labyrinthine Destruction after Removal of Aural Polypus.

CASE I.—Charles R., aged 47, a plumber, presented himself on May 27, 1912, at the out-patient department of the hospital complaining of a discharging left ear and deafness. The trouble began ten years previously and a polypus was removed a few years later. The discharge did not cease and this had always been a source of worry. A few months back he noticed a lump in the left ear which he said resembled the polypus which had been previously removed. He had not suffered from attacks of giddiness and he now wished to be relieved of the lump and the discharge.

On examination he was found to be deaf to speech and C2 tuning fork. Bone conduction slightly increased and "Weber" lateralized to the diseased side. A large polypus was seen slightly projecting from the meatus. A probe was passed round the polypus and its attached position seemed to be in the posterior superior quadrant of the middle ear somewhere in the region of the attic. He was anxious to have the polypus removed at once and the students present re-

quested me to do the operation in the out-patient department.

The ear was cleansed as well as possible and a solution of cocaine and adrenalin was applied for a quarter of an hour. The patient then sat in a chair with his head supported by a nurse. The wire of the polypus snare was carefully passed over the growth as far as its attachment; as the snare was being gradually tightened, the patient gave a sudden jerk of the head to the right which occasioned a sudden pull on the growth. The snare became detached without removal of the polypus and the result was startling in the extreme. He fell forward on the bench with arms extended and the head twisted round towards the left shoulder, with spasm of the extremities resembling an epileptic seizure. He was at once seized by most severe vertigo and projectile vomiting to a distance of about 2 metres. He was placed on his back in an adjoining room where he remained in a semi-conscious condition for the space of half an hour. It was noticed that he had violent horizontal and rotatory nystagmus to the right and left. He was carried to a ward and placed in bed on his back with head between sand-bags.

On admission his temperature was 37.8° C.. The patient had vomiting of cerebral type and his head rolled from side to side; his pulse was slow, irregular and of poor tension. His extremities were cold; the breathing was regular but slow. His pupils were equal in size and reacted to light. There was rotatory and horizontal nystagmus to the right. On his regaining consciousness the nystagmus increased on looking towards the right and lessened on looking towards the left. He was still vomiting and complained of some headache and of objects moving towards the right side and had a sensation of his own body moving in the same direction. The reflexes were normal. He had some blood-stained oozing from the left ear. Deafness was absolute on the left side. There was diminished bone conduction; "Weber" to the sound side.

May 28, 1912.—Temperature 37.8° C.. Nystagmus was still present of the same type; the pupils reacted to light; there was still severe vertigo and vomiting, but generally the patient's condition was slightly improved.

May 31, 1912.—Temperature 37.8° C.. Nystagmus was still present, but was more marked on looking towards right side. He did not feel quite so giddy and complained only of a feeling of sickness. There was no vomiting.

June 2, 1912.—The patient was doing well. He had a foul discharge from the left ear. Nystagmus was much less but increased on looking towards the right; it was absent on deviation of the eyes towards the left side.

June 6, 1912.—The patient felt much better; there was no vomiting or nausea. The nystagmus was much weaker. There was still some discharge from the left ear which was being treated with peroxide and syringing. A slight rise in temperature to 38.3° C. had taken place. The pulse rate was 80.

June 7, 1912.—The polypus was removed from the ear. The growth was completely disorganized and smelt somewhat foul. There was no difficulty in cleaning out the canal.

June 9, 1912.—The patient stated he felt well. The nystagmus was not evident. The discharge from the ear was rather less. The temperature was normal.

During the following week he made much progress, all symptoms subsided and the ear discharge cleared up. The temperature and pulse rate were normal.

June 21, 1912.—The patient got up for the first time, feeling well, but very unsteady in his gait.

June 22, 1912.—The patient was discharged from the hospital with a dry ear, but with complete labyrinthine deafness. Vestibular tests showed the labyrinth to be totally defunct.

For two months after leaving hospital he felt slight attacks of giddiness or unsteadiness, but this did not prevent him from carrying on his work.

Six months later he was in good health; there had been no discharge from ear since leaving hospital, no giddy attacks and no disturbance of equilibrium. There were signs of total labyrinthine destruction by tests.

This case clearly demonstrated the method that should not be employed for the removal of a polypus. In every case the patient should be in the recumbent position and under a general anæsthetic. The polypus was evidently located in the region of the attic and probably attached in the vicinity of the external semi-circular canal or adjacent parts of capsule.

The sudden labyrinthine symptoms were due, no doubt, to the sudden vigorous pull during the attempted extraction of the polypus and this brought about movements of the head and arms towards the diseased side, with violent horizontal and rotatory nystagmus towards the opposite side. The cause which brought about complete destruction of the labyrinth was possibly due to hæmorrhage.

The slight rise in temperature for several days after the onset was due to pus in the meatus. The temperature quickly subsided on removal of the disorganized polypus and the cleansing of the canal.

This case, if seen at a later stage, might very well have led us to suspect a latent labyrinthitis following on an acute suppurative condition. The history of the case, however, with severe labyrinthine disturbance, would clear this up, as disorganization of the labyrinth was noticed immediately after the attempted removal of the polypus.

Diffuse Serous Induced Labyrinthitis Supervening on Acute Suppurative Mastoiditis and Pus Around Lateral Sinus, in a Chronic Middle Ear Suppuration with Cholesteotoma.

CASE II.—William H., aged 28, was sent to hospital on October 17, 1916, for treatment of a discharging right ear and violent pains in the head, with vomiting and fever. When seen on the morning of admission he gave the following history:—

He had suffered from discharge in the right ear for seven years. At times he would get slight giddiness on stooping or rising quickly, with a slight staggering towards the right side. He complained of pain in the ear, daily headache, nausea and vomiting at times. He always felt tired and drowsy; his appetite was variable and he was very irritable. He said that he had been getting worse for the last 12 months. Very often his memory and hearing were not good. He was seized with violent pains in the head three days before admission to the hospital, with much feeling of sickness and vomiting. On admission the patient coiled up in bed, lying on the left side, complaining of violent frontal and occipital pain to the right side of the head. There were frequent retching and vomiting attacks; the tongue was foul. He had pains in the stomach and some diarrhœa.

There was well marked rotatory and horizontal nystagmus towards the left side and a less degree on looking to the right. His temperature 38.8° C., and his pulse-rate 100. There was slight pain on deep pressure over the mastoid and very slight discharge seen coming from the right ear.

On examining the ear it was seen that there was absence of the drum membrane. Some redness of internal wall of middle ear and sagging of the posterior wall of the external meatus were noted.

This case gave the impression of acute labyrinthine suppuration supervening on an acute mastoiditis, but functional testing showed otherwise. There was complete deafness to whispered speech, but C2 tuning fork could be heard for about five seconds. Bone conduction was a little diminished and "Weber" was strongly towards the healthy side. The cold caloric test to the diseased side gave slight increased nystagmus towards the healthy side; hot water to the diseased side considerably lessened the nystagmus towards the healthy side and slightly increased the nystagmus towards the diseased side. No fistula symptoms were present. The patient was too ill to test by turning. The functional tests clearly demonstrated the labyrinthine functions to be somewhat impaired and I concluded that the symptoms might probably be due to a serous labyrinthitis brought about by some acute condition in the mastoid and decided to operate during the afternoon.

Just prior to operation he had a rigour, with fever to 40° C., which suggested at once a probable lateral sinus infection.

Operation.—When the mastoid was opened, pus was seen coming from the mastoid cells under pulsation, which seemed to indicate that it came from the region of the lateral sinus. Complete radical mastoid was performed and a mass of cholesteotoma removed from the middle ear spaces. A collection of pus was discovered in the lateral sinus groove, but

the sinus itself was not involved. The bone of the inner tympanic wall in the region of the external semi-circular canal seemed a little roughened. This was not disturbed. The mastoid cavity was treated in the usual way and the posterior wound left open for two months on account of the cholesteotoma.

The day following the operation the patient felt considerably relieved. Temperature came down to 37.8° C., pain in the head had subsided, nausea and vomiting had ceased. Nystagmus was still present on third day after the operation, but could only be elicited by extreme deviation of the eyes towards the left side. At the end of the week from day of operaton the nystagmus had disappeared, the patient felt well and the appetite was normal. On the tenth day all symptoms had disappeared and he wished to get up.

From this time onwards he made an uninterrupted recovery. At the end of two months the mastoid cavity being clean and granulating, the posterior wound was freshened and closed and treatment afterwards continued through the meatus.

Patient left hospital three months from day of operation with a dry ear. At this stage was found slight impairment of function to caloric testing. Whispered speech could be heard 30 cm. from the ear. The C2 tuning fork vibrations transmitted by air conduction were perceived for ten seconds. The Weber test was lateralized towards the sound side.

This case is interesting on account of symptoms manifested 12 months previous to admission, *viz.*, giddiness and occasional sickness and vomiting on bending the head in certain directions. This would have led one to suspect labyrinthine fistula, but functional testing put this out of court. Again on admission, severe labyrinthine symptoms with nystagmus at once led us to look upon the case as one of acute labyrinthine suppuration. The test also disproved this assumption. All the symptoms in the first instance were clearly due to pressure of the cholesteotoma and following upon this, before admission to hospital, a serous induced labyrinthitis supervened, which cleared up without drifting into a purulent state about ten days after the radical mastoid operation and removal of cholesteotoma. The fever accompanying the symptoms was due to a peri-sinus collection of pus.

Circumscribed Labyrinthitis with Fistula in Horizontal Canal.

CASE III.—F. S., aged 39, a domestic servant, was admitted on March 6, 1916.

Nine years ago she had pain in the left ear after a cold in the head. Three days later the drum burst with discharge of pus. She had received treatment at various times, but the discharge had not ceased. Three years later the discharge became offensive. She again sought relief when a small polypus was removed, but the discharge continued in spite of treatment. She began to get attacks of giddiness and feeling of sickness and at times she vomited; this caused the ear to bleed, but it relieved the throbbing pain in the head. This condition continued on and off for four or five years. The attacks of giddiness were particularly severe at night when she was in bed and when she turned her head round on the pillow. The giddiness made her very sick. The last attack kept her in bed for three weeks like one long bilious attack. On March 3 she became very giddy and vomited nearly all day. That night she was called out of bed by her mistress and found she could not stand or turn round on account of the giddiness and feeling of sickness. Everything seemed to drop round her and she was very sick. She consulted a doctor who, after two days' treatment, sent her to me.

Present Condition.—There was complete deafness in the left ear to whispered speech; the C2 tuning fork was heard for 5 seconds. There was an increased Schwabach reaction and the Weber test was to the left. She complained of a sensation of great giddiness on standing or when lying down with eyes shut and of noises in the ears, but more particularly in the left, like the hiss of steam and sometimes like timber cracking. The noise was worse at night. The hearing had always been good in the right ear and the left ear was quite good until nine years ago when she first noticed there was a discharge; the hearing got gradually worse and now she said she was totally deaf. The discharge from the left was offensive, but watery. A polypus of fair size could be seen in the posterior superior quadrant. There was tenderness over the mastoid process. By the Romberg test the patient tottered towards the diseased side.

Caloric Test.—Cold water to the left ear produced a weak rotatory nystagmus towards the right side; hot water to the diseased side produced a weaker rotatory nystagmus towards the same side. Cold water to the right ear caused a strong rotatory nystagmus to the left side.

Test for Fistula Sign.—Compression of the air in the external meatus on the diseased side produced a decided horizontal nystagmus towards this side and rarefaction a decided but weaker horizontal nystagmus towards the right side. The patient was not subjected to turning. The temperature was 37.8° C., and the pulse-rate 110.

Diagnosis.—Fistula in the external horizontal canal and slight impairment of function of the labyrinth.

A radical mastoid operation was performed. Granulation tissue and polypi removed from middle ear spaces, the lateral sinus was exposed and found to be in a normal condition. There was no pus. Careful examination revealed a small carious patch on the prominence of the external horizontal canal; granulations over this were not disturbed. The mastoid operation was completed in the usual way.

On the following day the patient was quite comfortable, the temperature was normal, there was no headache. She complained of just a little giddiness without a feeling of nausea. On the third day after operation the mastoid cavity was re-dressed and this gave rise to attacks of giddiness which lasted only a few minutes. A week later on dressing the cavity under a strong light a fistula could be distinctly seen and on very gently touching this with a blunt probe, giddiness was produced with nystagmus towards the diseased side. Attacks of giddiness were produced at each dressing of the cavity during the next ten days or so, after which they gradually ceased. From this on the progress of the case was uneventful. Three months after operation the cavity was clean and dry. She remained well and free from giddiness, put on weight, and said she never felt better in her life.

A radical mastoid operation is generally all that is required in such cases with conservative treatment about the region of the fistula.

Attic Suppuration and Cholesteotoma with Fistula Symptoms.

CASE IV.—F. W., a merchant, was first seen by me in July, 1916.

History.—A discharge from the right ear began in August, 1906, after a cold in the head. Towards the end of September in the same year he consulted a specialist in Cape Town, South Africa, who diagnosed attic suppuration and advised a mastoid operation, which was declined. The following year he went to England where he consulted a well-known ear specialist who treated him for three months by syringing out the attic, inflation with the Eustachian catheter and by chromic acid applied to the part. The suppuration remained steady with little cessation. He came out to New Zealand three years later, the trouble in the ear had not improved. In May, 1910, he had a sharp attack of giddiness and vomiting and was confined to bed for a week. The attack of giddiness subsided after about three days from onset, but he felt nausea for quite a week afterwards and had to go about very quietly. He had frontal headache and a feeling of unfitness. He then went to Fiji for a time and was treated for two or three years by syringing and drops applied to the ear. He came to Sydney in 1915 and for a year had persistent attacks of giddiness. He felt as if, when walking, he wanted to catch his steps.

When he consulted me, I found on examination the drum was very thin and wasted, with a perforation in the attic, exposing the head of the *malleus*. There was no pus seen in the external meatus, but a suspicion of pus in the middle ear. This was verified by paracentesis which liberated some pus, distinctly foul in nature. There was no spontaneous nystagmus noticed but nystagmus could be elicited by forcibly bending the head to one side, which brought on a weak reaction towards the diseased side. Whispered speech could be heard close to the ear. C2 tuning fork by air conduction could be heard for 15 seconds. The usual tests

yielded the following results:—"Rinné" negative; bone conduction a little increased; "Weber" towards the diseased side; "cold caloric" to the left ear produced a normal nystagmus towards the diseased side, and *vice versa*. On pressing the tragus of the right ear sharply into the external meatus, a distinct horizontal nystagmus towards the diseased side was noticed, lasting about ten seconds. The diagnosis was suppuration of the attic and fistula in the external semi-circular canal. A radical mastoid operation was performed. A small mass of cholesteotoma was found in the mastoid antrum and a little roughness could be seen on the prominence of the external semi-circular canal. This was not disturbed. The middle ear spaces were gently curetted and the mastoid operation completed in the usual way. Three days later he complained of a little giddiness and there was slight spontaneous nystagmus towards the diseased side. The packing was removed and left out for two days, when it was again applied after a careful cleansing of the ear. After six weeks patient left hospital and at the end of two months was quite well with a dry ear.

This case is interesting on account of the long standing symptoms.

The attack with acute labyrinthine symptoms in 1910 may have been one of diffuse serous labyrinthitis which cleared up with only slight impairment of function, or it may have been due to an erosion and sudden fistula formation through the capsule, without involvement of the membranous labyrinth to any great extent and caused by the cholesteotoma or the eroding action of pus.

Circumscribed Labyrinthitis with Polypus in Region of Foramen Ovale; Acute Diffuse Suppurative Labyrinthine Supervening Three Days After Radical Mastoid Operation: Spontaneous Rupture of Pus Through Foramen Ovale.

Case V.—V. R., aged 16, consulted me in July, 1915.

Seven years ago she had suffered from discharging left ear and deafness, the attack originating after a cold in the head. A few days later after a good deal of pain, the ear began to discharge and gradually got worse. For three years or so she had suffered very much from pain in the head and down the back; the discharge had become very profuse and foul smelling. She suffered from severe headaches and sometimes thought she would go "out of her mind" on account of the pain. Two years ago she had pain on the affected side which lasted for three weeks. The area around the ear was sore and swollen and she could not bear to touch it. At the same time she had great giddiness and vomiting. She went to a doctor who gave her drops and applied hot fomentations to the ear. Something seemed to break and a lot of blood and "corruption" came away through the external meatus. For some time after this acute attack she had giddiness and vomiting and was unsteady in her movements. She consulted me a year later, on July 19, 1915, complaining of an offensive discharge from the ear and slight attacks of giddiness. On examination I found the drum completely destroyed and also what appeared to be a small patch of granulation tissue high up in the posterior superior quadrant of the inner meatal wall.

Testing for the Romberg signs, standing with feet together and eyes closed, she swayed slightly towards the left side; the same result was noted when the patient walked with her eyes shut. There was no spontaneous nystagmus seen on deviation of the eyes to right or left.

The caloric reaction with cold water to the left ear produced a slight rotatory nystagmus to the right which was intensified by deviation of the eyes towards that side. Cold water to the right ear gave a strong rotatory nystagmus towards the left. Compression of air in the meatus on the diseased side produced slow movement of the eyes towards the healthy side. She was not subjected to turning. The hearing on the diseased side was very much impaired. The C2 tuning fork by air conduction was heard for three seconds. Rinné's test proved negative. Bone conduction was shortened, while the Weber test was to right side.

I concluded from the history of this case and the tests that the patient had a circumscribed labyrinthitis with much impaired function and possibly a fistula. A radical mastoid operation was advised.

Radical Mastoid Operation (July 20, 1915).—A small polypus and granulation tissue were carefully removed from the inner tympanic wall just above *foramen ovale*. A fistula was not noticed. There was a considerable amount of granulation tissue in the antrum and adjoining cells and no pus round the lateral sinus. The usual flaps were made, the cavity was packed through the meatus with gauze and the posterior wound sutured and dressings applied. Dressings were changed two days later. The patient complained of slight pain on the left side of the head and a little giddiness on redressing the wound.

There was a gradual rise in temperature on July 23, 24 and 25. On the 25th it reached 40.2° C.. The patient had intense pain, occipital and frontal to the left, a pulse rate of 120, some retraction of the head and dilated pupils. Intense rotatory and horizontal nystagmus on looking towards the front and to either side, but more intense on deviation of the eyes towards the right side, with severe vertigo and vomiting. She lay on her back with her head on the pillow and turned to the right side. The reflexes were slightly increased.

The case gave me the impression of commencing meningitis following upon an acute suppuration of the labyrinth.

Lumbar puncture was performed, but the cerebro-spinal fluid appeared to be normal.

On removing the gauze packing and examining the wall of the inner ear, a small red pimple about the size of a millet seed could be seen in the position of the *foramen ovale;* from this pus could be observed spouting out under pulsation. Seeing that the labyrinth was draining itself, I decided to wait for a few hours before suggesting a labyrinthine operation. The following morning the patient was easier, and the temperature had come down to 39.4° C.; there was less pain in the head, slightly less vertigo and vomiting and altogether a little improvement. During the night the temperature dropped to 38.9° C., with marked improvement of symptoms.

On examining the ear again pus was seen welling out from the fistulous opening and dressings were re-applied every half hour. During the next two days the temperature gradually dropped and became normal on July 27. From this time onwards the temperature remained about normal; all the symptoms disappeared and the nystagmus which was directed towards the healthy side, gradually lessened and cleared up. The labyrinth drained itself out.

On otoscopic examination a distinct fistula could be made out in the region of the oval window. For about a month the ear discharged, the mastoid cavity requiring daily dressings. This cleared up a few weeks later and the patient left hospital.

A year later the patient was in perfect health with a dry ear, but had a totally defunct labyrinth.

Without doubt this was a case of chronic circumscribed labyrinthitis with fistula and a much impaired labyrinth as to function. An acute exacerbation was set up by the radical mastoid operation and curettage of the labyrinthine capsule in the region of the *foramen ovale* for removal of a polypus and granulations.

Judging from the severity of the symptoms, it is probable that the patient would have succumbed, had not the pus suddenly ruptured through the fistulous tract and at once relieved the pressure within the labyrinth, which drained itself out.

The acute symptoms two years before admission were, no doubt, due to an acute suppurative mastoiditis which, fortunately for the patient, drained away through the meatus; it seems that the acute labyrinthine symptoms at the same time were probably due to a diffuse serous secondary labyrinthitis, which cleared up, leaving the labyrinth somewhat impaired as regards function.

Rupture of Labyrinthine Capsule by Removal of Polypus in old Chronic Purulent Otitis Media: Acute Diffuse Serous and Purulent Labyrinthitis Supervening on Eighteenth Day After Radical Mastoid Operation.

Case VI.— W. P., aged 45, a sea pilot, had a discharging left ear for 10 years prior to February, 1912, which he contracted during a sea voyage after a bad cold. Some months later he attended the Golden Square Hospital, London, on and off for two years at intervals. The discharge did not

clear up and a mastoid operation was advised. He refused to undergo the operation as he wished to go to Australia. On arrival in Sydney he took up work as a pilot on the north coast. The ear discharge persisted and he syringed out the ear occasionally and applied drops which had been given him in London. He consulted a doctor at a northern port who removed a polypus with a snare. Immediately afterwards he was seized with attacks of giddiness and vomiting and could not stand without support. Two days later he was sent to Sydney by train to consult me. He entered my consulting room supported by his wife, quite unable to stand alone, fell into a chair and vomited. It was noticed that there was marked spontaneous nystagmus to the right and left, more intense on deviation of the eyes towards the left side. Bending the head towards the left shoulder produced a violent attack of vertigo and vomiting. On examining the ear it was noted that there was a large perforation in the posterior superior quadrant of the membrane through which blood or granulation was seen on the inner wall above the oval window. A watch was heard on contact; whispered speech could be heard close to the ear. The C2 tuning fork by air conduction could be heard for about eight seconds. Rinné's test was negative; with Weber's test, the sound was perceived on the left side. There was increased bone conduction. The caloric test applied to the diseased side produced typical rotatory nystagmus towards the healthy side. The fistula symptom was well marked.

Diagnosis.—Fistula in the labyrinthine capsule in the neighbourhood of the external semi-circular canal or just above the *foramen ovale*. He was sent to hospital and after seven days' rest in bed, the symptoms lessened. The labyrinthine function was again tested and gave results similar to those noted above. The following day a radical mastoid operation was performed; pus and granulations were removed from the antrum and middle ear. On careful examination a rent could be distinctly seen in the capsule immediately above the oval window surrounded by pus and granulations. From this area no doubt the polypus had been removed. The fistula was undisturbed and the operation completed in the usual way. On the fourth day after operation the dressings were re-applied. At the end of the eighth day the nystagmus and vertigo had disappeared and on the tenth day after operation he was allowed to get up. He went about the ward for several days, making himself generally useful by assisting the nurses with the patients' meals, feeling perfectly well in every way. On the 18th day after operation he was suddenly seized wtih intense giddiness and vomiting and retired to bed. I saw him four hours later and found him curled up in bed on his right side in great distress, on account of intense vertigo and feeling of sickness with occasional attacks of vomiting. There was marked rotatory and horizontal nystagmus towards the right side; the temperature was 37.5° C., and the pulse-rate 90. The dressings were removed from the ear and were not re-applied. On the following morning it was found that he was absolutely deaf on the diseased side, Weber's test was lateralized towards the sound side. The hot caloric test applied to the diseased side altered the nystagmus slightly towards the diseased side. The fistula test was not undertaken, as the labyrinth responded to the caloric test. On the third day the condition was about the same; the temperature was 38.3° C., and the pulse-rate 110. On the fifth evening from onset of symptoms the temperature went to 39.7° C., and the pulse-rate to 120. He complained of intense giddiness with frequent attacks of vomiting and of great headache on the left side and down back of neck; he appeared to have some retraction of the head. The pupils were dilated, equal and reacted to light; the knee jerks seemed a little exaggerated. Vestibular tests were applied with negative result. It was evident now that the case had drifted into one of acute diffuse purulent labyrinthitis and as meningeal irritation was present, I at once decided to open up the labyrinth. This was done by the method of Neumann; fluid pus was found in the vestibule and canals. The *dura* was exposed as far as the internal auditory meatus, but nothing unusual was found. The *dura* was not opened. The posterior wound was left open and gently packed with iodoform gauze and the patient returned to bed. The following morning temperature came down to 37.5° C., and he complained of less headache, but there was still well marked nystagmus towards the right side. He had some feeling of sickness, but did not vomit. From this onwards he made an uninterrupted recovery and after ten days was allowed to sit up in bed. Two days later the posterior wound was closed and dressings reapplied through the meatus in the usual way. He was allowed to get up a fortnight after operation, but for quite six weeks on getting about he was a little unsteady in his gait. This gradually passed off and three months from his arrival in hospital, he left my hands with a dry ear; three months later he again resumed his work in a northern port.

This case clearly points out the advisability of a careful examination for the position and attachment of polypi before removal. In this case of forcible extraction of the polypus, a portion of the labyrinthine capsule was torn off, giving rise to circumscribed labyrinthitis with fistula in the capsule, but without involvement of the membranous labyrinth. It is also interesting that the acute labyrinthine symptoms should have supervened as late as the 18th day after the radical mastoid operation. The first involvement was undoubtedly a diffuse serous secondary labyrinthitis, as shown by the tests, but on the fifth day this had drifted into an acute purulent stage, with symptoms of meningeal irritation which at once nessitated a labyrinthectomy by Neumann's method and exposure of the *dura*.

References.

(1) *Bárány, R.*: "*Physiologie und Pathologie des Bogengang-apparates beim Menschen,*" Leipzig und Wein, 1907. *Ibid.*, "Diagnosis and Treatment of Infective Labyrinthitis," British Medical Association, London, 1910 (*Lancet*, Nov. 26th, 1910, page 1675). *Ibid.*, "Differential Diagnosis Between Labyrinth Suppuration, Serous Labyrinthitis, Cerebellar Abscess and Serous Meningitis of the Posterior Fossa," *Trans. of the Ninth International Congress*, 1912.

(2) *Brieger*: *Trans. Seventh Internat. Otol. Cong.*, Bordeaux, Aug., 1904, *vide Archiv. Otol.* XXXIV. and *Journal Lary. Rh. Otol.*, October, 1904. *Ibid.*, *Archiv. Otol.*, October, 1902, page 415.

(3) *Freytag*: "*Prognose der operat. Eröffnung des eitrigen erkrankten Labyrinthes,*" *Zeitschrift f. Ohrenh. Bd. li.*.

(4) *Hinsberg, V.*: "*Referat über Labyrintheiterungen,*" *Verh. d. Deutsch. Otol. Gessell*, June, 1906. *Ibid.*, "*Ueber Labyrintheiterungen, Zeitschrift f. Ohrenh.*, 1901, Bd. 40. *Ibid.*, *Archives of Otology*, 1902, XXXI., pp. 112 and 161.

(5) *Jansen, A.*: *Trans. International Congress*, Moscow, 1897. *Ibid.*, "*Ueber eine häufige Art der Betheiligung des Labyrinthes bei den Mittelohreiterungen,*" *Arch. f. Ohrenheilk*, 1898, Vol. XIV., page 193. *Ibid.*, Vol. XXXV., page 290, and Vol. XXXVI..

(6) *Milligan*: *Journal of Larying. Rhin. and Otology*, London, 1904, XIX., p. 132. *Ibid.*, *Brit. Med. Journ.*, 1907, ii. p. 983.

(7) *Politzer*: "Diseases of the Ear."

(8) *Ruttin*: "Diseases of the Labyrinth."

(9) *West*: "Treatment of Infective Labyrinthitis," British Med. Assoc. London, July, 1910.

(10) *West and Scott*: "The Operative Surgery of Labyrinthitis," *Proceedings Otol. Sect. Royal Soc. of Med.*, March 1908. *Ibid.*, Operations of Aural Surgery, 1909.

(11) *Whitehead*: *Trans. Otol. Soc.*, 1904, V., p. 49. *Ibid.*, *Journ. Laryng. Rhin. Otol.*, 1904, Vol. XIX, No. V., p. 242.

BLOOD TRANSFUSION.[1]

By **J. J. Power, D.S.O., M.B., Ch.M. (Sydney), F.R.C.S.E.**

In this paper to-night I intend only to describe the methods of blood transfusion we carried out at No. 2 Australian General Hospital, but I might mention that, judging from the literature on the subject, they were those in general use throughout the British Army.

[1] Read at a meeting of the Queensland Branch of the British Medical Association on April 9, 1920.

Our indications were shock, primary and secondary hæmorrhage and in a few cases of chronic sepsis, with the resultant anæmia.

In civil life there would be the medical indications, such as anæmia, hæmophilia and *hæmophilia neonatorum*; in the latter case I believe it is especially valuable and some authorities claim great success in some cases of pernicious anæmia. The work is still in the experimental stage and seems worthy of more attention than it is receiving. It is believed to act by stimulating the erythroblastic reaction of the marrow.

Physiological Principles of Blood Transfusion.

One of the chief investigators in this field is Professor Boycott, of University College Hospital, London. He attacked the subject by estimating under various conditions the oxygen-carrying capacity of the blood, his experiments being carried out on rabbits.

It was found firstly that salt solution was treated as a foreign substance and expelled within a few hours after transfusion, so that it is now accepted that saline solution may tide over a sudden emergency, but as it is disposed of by the animal in a few hours, no permanent good can result from it. He confirmed von Limbeck's observations that fluid of some sort is necessary for the restoration of the normal hæmoglobin volume; for instance an animal will recover quicker from hæmorrhage if fluid is placed in the stomach.

Secondly, animals were transfused with blood without preliminary bleeding; it was found that the animal destroyed the transfused blood at an average rate of 0.45 c.cm. hæmoglobin per day and further that later transfusions were destroyed at 2 to 8 times this rate up to 3.5 c.cm. per day. The reason for this is not clear. Their conclusion was that it was due to the foreign nature of the transfused cells. This goes to prove that the animal organization is adjusted to a certain standard of blood volume and hæmoglobin content and any surplus is destroyed. Next an animal was bled and transfused immediately. It was found no erythroblastic reaction occurred; apparently the deficiency in oxygen-carrying capacity was supplied by the transfused blood and no call was made upon the marrow. In contrast to the transfusion of animals without bleeding, it was found that animals previously bled, kept the transfused hæmoglobin and used it but only up to a certain extent; the animals objected to too highly concentrated blood. The limit of concentration in man is reached when hæmoglobin content transfused is half that already present in the body; red cells in excess are destroyed, but this destruction stops when there is a danger of the hæmoglobin falling too low. The animal organization tends to keep its blood volume and hæmoglobin content about a constant level. This goes to prove that successive transfusions are likely to raise the viscosity of the blood and the practical application is that in future, if it is to be scientifically done, the oxygen-carrying capacity of both recipient and donor will be estimated with a view to transfusing the actual amount of blood required to restore the recipient to his ordinary normal level.

Blood transfusion as a therapeutic measure, though its value was well recognized in pre-war days, was not practised to the extent that it undoubtedly merited until a method of combating shock was urgently called for during the early days of the war and the old method of transfusion of saline solution was found to be of only very temporary benefit.

Blood transfusion was then extensively revived and found to be of such enormous value that much new work was done in this field and the whole question was dealt with in a scientific manner. The pathology of transfusion was elucidated and the technique vastly improved.

The indications were such as had always existed, but it was not until these were brought very forcibly home to the minds of surgeons by the awful calamities that were so often witnessed in the field consequent upon severe traumua or hæmorrhage, that these indications were met in a thoroughly efficient manner by the revival of blood transfusion.

We now come to the question of testing the compatibility of the blood of recipient and that of the donor. One of the pioneers in this field is Moss, who in 1910 found that all individuals fall into four groups as regards the hæmolytic and agglutinative properties of their blood. The occurrence of isolysins in human blood apart from disease had been noted in 1892 by Maragliano. Moss, however, further established the fact that the occurrence of isolysins is parallel with that of isoagglutinins, and he grouped human sera into the following four groups according to their agglutinative properties:—

Serum of Groups.	Cells of Group I.	II.	III.	IV.	Number of Individuals in Group.
I.	0	0	0	0	I. 5%
II.	+	0	+	0	II. 40%
III.	+	+	0	0	III. 10%
IV.	+	+	+	0	IV. 45%

+ = Agglutination. 0 = No agglutination.

In his grouping Group 4 is the universal donor; it has been shown that 45% of individuals come under this group. The desiderata are:—

1. Either the recipient and the donor should belong to the same group; or
2. The serum of the recipient should not agglutinate the corpuscles of the donor (the reverse is unimportant).

If in civil life, stock sera are not available, a simple test is a method as advocated by Rendle Short:—

> Draw off a few cubic centimetres of blood from the recipient, allow it to clot in a tube, take a large drop of serum and mix with 1% sodium citrate solution, mix in a little of donor's blood and examine for agglutination; if it occurs in five minutes the donor is unsuitable; final readings should, however, be deferred for fifteen minutes.

Syphilis, malaria, etc., should also be excluded in the case of the donor.

Method of Administration.

First I will deal with indirect transfusion of unmodified blood by paraffin-coated tubes. It is essential that attention to detail be strictly observed both in the preparation of the tube and in the technique, as otherwise success cannot be achieved.

Apparatus Required.

The tube we used was the ordinary Carrel tube having a capacity of 500 c.cm.. In preparing the tube it is important to have the cannula short (3 cm. long) and narrowing rapidly towards the point where

the lumen is approximately 2 mm. diameter. The structure of the cannula is the most important part of the apparatus, it being necessary that it shall be small enough at the tip to enter the vein easily and the lumen of sufficient size to insure a good flow of blood. The air tube in the form of a hollow glass rod is passed through the rubber stopper and to this is attached a Higginson's syringe or any similar bulb which acts as a pump to exert pressure in the tube during the infusion of the blood.

Preparation of the Tube.

After use the tube must immediately be washed out, a good method being as follows:—Wash out with salt solution until all fragments of fibrin are removed. Then fill with hot water and soap and with a bottle brush proceed to remove the paraffin. Next run in some chloroform to dissolve any remaining patches of paraffin. Finally the tube must be thoroughly cleaned out and dried with alcohol and ether and then sterilized in the autoclave.

It is now ready for the paraffin coating. The operator now grasps the tube with gauze and heats it over a "Primus" stove, making sure that all parts of the tube are heated, and inspecting carefully to see that there is no moisture in the tube. Ordinary hard sterilized paraffin way is now poured into the tube, which is rotated so that the paraffin covers all parts. Care should be taken that the whole of the cannula is thoroughly coated. The excess of paraffin is now poured off, only a few cubic centimetres being allowed to remain. The stopper is then correctly adjusted, *i.e.*, with the air tube pointing in the opposite direction to the cannula. The tube is now inverted and the wax allowed to set around the stopper. The stopper must not be moved until the wax is properly set. Swabs soaked in ether are rubbed over the surface of the tube in order to solidify the paraffin before too much flows away. The tube is then ready for use.

Technique of Transfusion.

Technique requires an operator and a sister, but matters are greatly simplified if there is a second surgeon to act as assistant.

The donor and the recipient are placed on two tables, with the arms that are to receive and give blood extended at right angles and lying near each other. It is very important that the operator at this stage takes up the correct position, so that he can hold the bulb in his right hand and work direct from donor to recipient, taking for granted that he is right-handed. An example will serve to illustrate this point:—The blood is being taken from left arm of the donor to the right arm of recipient. The surgeon should be standing at the head of the operating table and facing the feet; if he is standing in the opposite position facing the head, he will have to work with the left hand, making the procedure much more difficult.

It is important before commencing to choose large superficial veins to work on, usually the medium basilic or the cephalic. It is best to dissect out the vein after applying an arm band of blood pressure apparatus which is kept on until the blood is withdrawn.

The skin is prepared in the usual way and local anæsthesia is used. We found 1% novocaine to which is added a little adrenalin very satisfactory. An incision is made 3.75 cm., so that the vein will be well exposed and to facilitate the operation, veins of both donor and recipient should be dissected free of surrounding tissues. If two operators are working, one can prepare the recipient, while the other takes the blood from the donor. If only one man is working, he must be careful not to work from the recipient to the donor, without changing gloves in the interval, as fatal cases of infecting the donor have been recorded.

Our method was first to prepare the recipient, to dissect the vein clear and to place two catgut ligatures around it, but not to tie them until the blood was taken from the donor. The operation field was left covered with a moist saline swab. Gloves were then changed and the work on the donor begun. Two ligatures were put round the vein, the proximal one being tied and used for traction. The vein was then put on the stretch, held with small forceps and an oblique incision towards the wrist made in it. The cannula was then passed along the lumen of the vein and the distal ligature tightened around the cannula so as to steady it in position. The donor was made to open and close his hand slowly, and usually in about 5 minutes 450 c.cm. of blood were obtained. If the blood did not flow in freely, it was often due to the opening in the cannula being pressed against the wall of the vein. Once the blood was flowing in freely it was found to be important to hold the tube perfectly steady. Before the cannula was withdrawn the index finger was placed firmly over the air tube and the bulb tilted a little until it was introduced into the vein of the recipient. The distal ligature on recipient's vein was then tied. The reason this was not done earlier is to obviate the risk of thrombosis. The wall of the vein was picked up with fine mouse-tooth forceps and an oblique cut towards the shoulder was made in it. The cannula was passed along the lumen of the vein, the proximal ligature being tightened around it. Then the finger was removed from the air tube and a Higginson's syringe or some similar pressure apparatus was attached. Five minutes were usually allowed for the introduction of the blood. The flow should be slowed up if there are any symptoms of distress.

The following symptoms necessitate slowing of the infusion:—Pain in the lumbar region; dizziness; nausea; flushing; sense of bursting in the chest. If these persist after the flow has been temporarily stopped, the transfusion should be abandoned.

I have been fortunate enough not to encounter any trouble. This would arise if there were faulty group determination or thrombosis. If hæmolysis occurs we get vomiting, dyspnœa or urticarial rash, quick pulse and perhaps convulsions. A later complication is hæmoglobinuria.

When the blood level is near the bottom of the tube the pressure should be reduced and the cannula withdrawn while there is still a little blood in the tube, so as to avoid the risk of an embolism. The proximal ligature is then tied and the incision closed. The donor can be finished off by the sister or assistant if they have not been in contact with the recipient. After the transfusion is completed and the

patient returned to bed, he may have a slight rigor or urticarial rash, but these symptoms are of no serious import.

Citrated Blood Transfusion.

The only special apparatus required is a glass tube, diameter of about 1.25 cm., narrowed off into a cannula which is inserted into the vein. This is coated with paraffin before use. The receptacle is an ordinary enamel jug and in it is a glass rod. The mixture is continually stirred as the blood flows in. In the jug are 256 c.cm. of a 3.8% solution of sodium citrate and blood is added to one litre. This mixture is then injected in the usual manner of a saline solution injection, through the glass funnel and rubber tubing with a needle passed into the vein. The needle should be of large bore 2 mm. in internal diameter.

The preparation of the donor is as described in the lrst method.

It appears from the benefits derived from transfusion in war surgery that there must be scope for this work in civil life, in cases, for instance, of severe injury requiring immediate operation, when the condition of the patient contra-indicates operation until the shock is in some way efficiently treated.

I would just like to refer to one case illustrating what I have already said. The patient was a soldier with a very septic wound of the buttock and severe secondary hæmorrhage from the gluteal artery. When on the operating table he was to all intents and purposes dead; he was pulseless, his lower jaw was sagging and as far as we could make out the respiration had ceased. There were many medical men in the theatre at the time and the majority thought it was a waste of time to go on with the case. This, however, did not deter Lieutenant-Colonel Maclure, who proceeded with the transfusion, giving the man 1.7 litres of blood from three separate donors, 1.1 litres of a 4% sodium bicarbonate solution and 0.6 litre of a 6% gum acacia solution. He quickly regained consciousness and while on the table said he was feeling all right. After being returned to his bed he indulged in the usual cigarette. This patient, I certainly think, owed his life to the transfusion.

Reviews.

POPULAR HYGIENE.

In Dr. A. Knyvett Gordon's book, "Health in the Home,"[1] a very readable and well-balanced account is given of the mechanism and functions of the body, the early signs of common ailments and domestic hygiene. These three sections are arranged in separate chapters of varying length, which deal simply, yet accurately, with the physiological functions and their disturbance, the more usual causes of such disturbance and the best methods by which to prevent them by attention to the known laws of health.

The intention of the author "to place before non-medical readers a brief account of the meaning of the symptoms of disease, with the object of assisting in its prevention" has been well carried out. Treatment and cure are seldom dealt with, but are rightly left to the family physician, whose aid the reader is constantly enjoined to seek. Particular stress is laid upon "the influence of faulty education in childhood and at the school age on disease in later years." Very sound advice is given on the importance of keeping the teeth clean, with minute directions as to how it may be done. Warnings against the all-too-prevalent habit of using aspirin and other sedative preparations for the relief of pain, and particularly of headaches, without medical sanction and often to the masking of serious and insidious disease, are timely. The custom is extraordinarily common, especially among women, many of whom carry these drugs with them constantly, and not only use them often themselves, but press them upon all and sundry, who complain of even slight pain of any kind.

The necessity of early and adequate treatment of earache is rightly urged upon parents and guardians of children. The present attitude of the general public, and unfortunately of many members of the profession, to this frequent ailment of early childhood is altogether too indifferent. Its evil results are constantly encountered in the large numbers of deaf—often very deaf—persons whose disability could have been prevented, had treatment been sought and given during the first attack of pain.

Hypertrophied tonsils and adenoids and their connexion with "croup" and other less striking, but even more permanent, troubles are described. "Growing pains"—a not yet discarded superstition—are explained and their true nature set forth. A plea for the adequate isolation of those suffering from "colds" is entered under the heading of "contagious diseases" and deserves to be upheld by all doctors, many of whom are themselves very careless of precautions when suffering from this disease. Constipation and its consequent evils and the use and abuse of aperients are all shortly but adequately dealt with.

Under the section devoted to domestic hygiene, most excellent advice is given as to the environment best adapted to the growing child, the school age, adult life and old age. Housing, clothing, feeding, sleep, study, recreation, work and exercise are all reviewed. The chapters on food and drink and on cookery are especially worthy of notice. They are eminently practical and give in an easily understood and remembered form the caloric values of the more commonly used foods, with suggestions as to the best methods of combining the necessary proportions of protein, carbo-hydrates and fats to produce nourishing and appetising meals.

The much-debated subject of alcohol, its uses and abuses, is touched upon; clear and sensible directions are given as to how it may best be used as a "food," which the author claims it is. Upon this point scientists are surely not unanimous. However, if all who used alcohol, followed the directions given, the most rabid "teetotaller" would be left without a cause of complaint.

The views expressed as to the non-advisability of sending a child to school under seven years of age must surely be intended to apply only to those parents who are able either to supervise and teach their children themselves or to pay someone else to do so. This the vast majority of the world cannot do. The young children of the manual workers and particularly those of the industrialists, are surely much better from every point of view to be gathered into properly built and well conducted kindergartens and infant schools than to be left to play in the streets, or worse still, in small houses closely crowded together. The airy school-rooms, with well kept playgrounds, organized, directed movements taught as games, lessons on every-day life told as stories, with frequent intervals for rest and with many changes of occupation, which now form the school surroundings and life of the young Australian are very different from those which prevailed twenty years ago and in cities at least certainly make for health of both mind and body.

Taken as a whole. the book can be cordially recommended as most suitable for use and reference in any home and more especially for one in which young children are growing up.

[1] Health in the Home, by A. Knyvett Gordon, M.B., B.C., B.A.; 1919. London: Jarrolds, Publishers (London), Limited; Crown 8vo., pp. 245. Price, 5s. net.

CONTROL OF MALARIA IN AUSTRALIA.

We have been requested to call the attention of members to the following memorandum of the Federal Quarantine Bureau:—

> Under arrangements made with the Department of Repatriation at the end of last year, medical officers of Repatriation Local Committees are requested to notify by wire to the Director of Quarantine in Melbourne, all relapses of malaria occurring in ex-members of the Au-

tralian Imperial Force and to submit blood films for examination. In very few instances, however, have blood films been submitted as requested. The importance of blood examination in order to secure correct diagnosis and to ascertain the type of infection under treatment is evident, and the attention of local medical officers is drawn to the directions set out in the circular which was issued to all local medical officers in this connexion, under which blood films are to be prepared and forwarded to the Chief Quarantine Officer in each State, or to the Director of Quarantine in Melbourne, where they will be examined and the result of examination notified to the medical officer concerned.

THE CIVIL AMBULANCE AND TRANSPORT CORPS OF NEW SOUTH WALES.

The St. John Ambulance Brigade in Sydney undertakes the work of the transport of persons who have met with accidents or who have been taken ill, through the Civil Ambulance and Transport Corps. According to the annual report for the year ended September 30, 1919, the Corps responded to 18,154 calls and its ambulances travelled no less than 91,805 miles during the 12 months. In 15,316 instances persons were conveyed to hospitals, homes, the Reception House, trains or boats. In 1,389 cases the services of the officers were not required on arrival. First-aid was given in 1,261 instances and in the majority of these cases the patient was referred to a private medical practitioner or to an institution for further treatment. The ambulances attended at 188 sports meetings, by arrangement. The very large increase in the activity of the Corps was occasioned by the necessity of prompt removal of patients to isolation during the influenza epidemic. In the first year of its existence (1899-1900) the Corps received 1,384 calls. In the year 1917-1918 it responded to 9,773 calls. It will thus be seen that during the year under review the number of calls was nearly twice that of the previous year. It is interesting to note that the services of the Corps were required 112 times at the 188 sports meetings attended. In addition to the headquarters and the city station, there are branch stations at Balmain, at Myrtle Street, North Sydney and at Randwick. The branch station in Newtown was closed during the year to obviate the overlapping of the work. The equipment at the various stations consists of five motor ambulances, two horse waggons and nine ambulance litters.

The expenditure during the year amounted to £9,656, including £5,452 for wages and £2,132 for the running of motor and horse ambulances. To meet these expenses the Corps received £1,578 as subscriptions and donations, a legacy of £100 and £50 from the Walter and Eliza Hall Trust. The income from payment for transport services was £5,311. As over 10,000 calls were on Government instructions, the Committee appealed for a grant and the Government contributed £2,500. The year's revenue was therefore £116 short of its expenditure.

Congress Notes.

The date of the Australasian Medical Congress is August 23-28, 1920. The Congress will be held at Brisbane.

Medical practitioners proposing to read papers at the Congress are requested to communicate with either the local Secretary in the State in which they reside or with the Secretary of the section concerned. There are eleven sections, as follows: (*i.*) Medicine, (*ii.*) Surgery (*iii.*) Obstetrics and Gynæcology, (*iv.*) Pathology and Bacteriology, (*v.*) Public Health, (*vi.*) Ophthalmology, (*vii.*) Otology, Rhinology and Laryngology, (*viii.*) Diseases of Children, (*ix.*) Naval and Military Medicine and Surgery, (*x.*) Neurology and Psychological Medicine and (*xi.*) Dermatology and Radiology. The names and addresses of the Sectional Secretaries have been published in the first official circular.

The subscription to the Congress is £1 1s. for members residing in any part of Australasia except Queensland. The Queensland members will pay £2 2s.. Medical practitioners who have not yet joined, should notify the local Secretaries of their intention to attend the Congress and should forward their subscriptions as soon as possible. The Executive Committee is prepared to make arrangements for the accomodation of members and their wives, provided that the applications are received at an early date.

Public Health.

THE HEALTH OF AUSTRALIA.

Infective Diseases Notified in Australia During the Year 1919.

	New South Wales.		Victoria.		Queensland.		South Australia.		Western Australia.		Tasmania.		Commonwealth.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.[1]	Deaths.
Enteric Fever	790	122	264	33	680	69	124	17	237	21	168	11	2,263	273
Scarlatina	1,004	16	1,778	35	251	4	1,240	8	657	3	31	3	4,961	69
Diphtheria	3,024	126	4,212	203	2,364	94	1,326	78	971	32	914	17	12,811	550
Pul. Tuberculosis	1,150[2]	1219	1,186	1,028	361	403	430	320	467	291	189	114	—	3,392[3]
C'bro-Sp'l Meningitis	29	33	22	16	23	14	12	7	4	4	10	7	100	81
Poliomyelitis	6	13	2	6	125	19	5	3	2	0	1	0	141	41
Malaria	34	3	0	1	5	19	0	1	686	10	—	0	—	34
Puerperal Fever	—	1	48	4	20	4	12	1	0	1	0	1	—	12
Septicæmia, Pyœmia	—	42	0	51	—	23	—	13	9	9	12	11	—	149
Bilharziosis[4]	—	0	—	0	1	0	0	0	9	0	2	0	—	0
Morbilli	—	8	0	14	—	8	3,593	3	—	0	—	1	—	34
Pertussis	—	104	0	33	—	46	522	9	—	7	—	12	—	211
Ophthal. Neonatorum	—	0	0	2	—	1	—	0	14	1	11	0	—	4
Erysipelas	—	25	0	6	120	13	73	3	49	7	0	1	—	55
Anchylostomiasis	—	0	—	0	20	1	—	0	—	0	—	0	—	1
Beri-Beri	—	1	—	0	—	25	—	1	—	5	—	0	—	37[4]
Continued Fever	—	0	—	0	1	0	—	0	32	0	—	0	—	0
Pneumonia	—	—	—	—	476	—	—	—	—	—	—	—	—	—
Influenza	21,731	5,783	15,065	3.455	39,265	1,046	7,379	518	5,559	512	942	225	89,941	11,552[5]
Dysentery	—	0	—	0	2	0	—	0	—	0	—	0	—	0
Encephal. Lethargica	—	0	—	0	—	0	—	0	—	0	1	0	—	0
Dengue	—	0	—	0	—	0	—	0	271	0	—	0	—	0

[1] The total number of cases notified is not given of those diseases which are not notifiable in all the States.
[2] Notifiable only in portion of the State.
[3] Including 17 deaths in Northern Territory.
[4] Including 5 deaths in Northern Territory.
[5] Including Hæmaturia.
[6] Including 12 deaths in Northern Territory and one in Federal Territory.

The Medical Journal of Australia.

SATURDAY, MAY 8, 1920.

Preventible Deaths.

It is an obvious platitude to state that diphtheria is a preventible disease. Ever since 1883 when Klebs discovered the bacillus of diphtheria and since 1884 when Löffler isolated it in pure culture, the opportunity of gaining a control over this agent of destruction has been recognized and strenuously advocated by hygienists. In 1888 Roux and Yersin were able to show that this organism possesses a somewhat unusual character, shared by a limited number of other bacteria, of producing in the medium in which it is growing a specific toxin. There are several points in connexion with this bacillus that are of importance in prophylaxis. The organism is readily destroyed by antiseptics outside the human body. While diphtheria occurs in domestic animals and in some birds, its prevalence, save among human beings, is extremely small, and from the epidemiological point of view, the common source of infection is a person who is suffering from the disease or who is harbouring the bacteria. Diphtheria bacilli may lie dormant, yet alive, for several months in dried diphtheria membrane. The dried membrane is sterilized readily by heating to 58° C. for ten minutes or by exposure to weak antiseptics, such as 0.01% perchloride of mercury solution, for a very short time. On the other hand human beings often harbour diphtheria bacilli for very long periods, notwithstanding that the so-called "carriers" exhibit a high degree of immunity to the disease. The problem of the carrier is a very real one. No known method can be implicitly relied on to remove the infecting agent. There are many methods which yield good results in a relatively high proportion of cases, but none that have proved efficacious in all. It is, however, important from an epidemiological point of view to recognize that persistent carriers of diphtheria bacilli are infrequent and that in the majority of instances, the bacilli disappear within a few weeks after recovery from the attack of diphtheria. In view of these facts, it may be stated that the prophylaxis of diphtheria depends on the detection and isolation of the "previous case," on the immediate removal of all sources of infection from the general community and on the efficient treatment of those who are attacked.

In the year 1888 Richet and Héricourt demonstrated that it was possible to convey immunity to an infection by means of the serum of an immune animal. In the following year Babes and Lepp were able to show that the immunity of an animal was due to certain substances circulating in the blood and that these substances could be introduced into the blood of another animal, with a resulting immunity. In 1890 von Behring and Kitasato made the important announcement that animals could be immunized against tetanus toxin and that the serum of these artificially immunized animals, when injected into susceptible animals, produced a high degree of immunity against tetanus. In the same year von Behring discovered that the same procedure could be followed in the case of diphtheria. In the year 1895 antitoxin was produced in sufficient quantities to enable its effect to be judged in a relatively large series of cases in England. The test was carried out at the Eastern Fever Hospital of the Metropolitan Asylums Board and was entirely favourable. While the case mortality in the Metropolitan Asylums Board hospitals in the year 1894 was 29.6%, in the following year it was slightly reduced to 28.1%. The value of the antitoxin treatment was demonstrated by a comparison of the patients treated during the first and second day of disease. Without antitoxin the mortality among the patients admitted on the first day of disease was 22.5% and among those admitted on the second day of disease was 27%. The mortality of patients admitted on the first day of disease and treated with antitoxin was 4.6% and among those admitted and treated with antitoxin on the second day of disease was 14.8%. Since the early days with gathering experience, it has been possible to save every patient treated with antitoxin on the first day.

Prophylactic injection of toxin-antitoxin was suggested as an effective measure by von Behring shortly before the outbreak of the war. It was difficult to ascertain the details of the technique at first, but information has been collected and is now available.

Although we are unaware of any extensive application of this preventive measure, we understand that eminently satisfactory results have been obtained. It can, however, be shown that it is only rarely necessary to have recourse to prophylactic injections in order to combat an outbreak promptly and effectively.

In London during the four years prior to the introduction of diphtheria antitoxin, the case incidence varied between 1.5 and 3.2‰. In New South Wales the incidence was 1.12‰ in the year 1898 and in the same year it was 1.34‰ in Victoria. The death-rate per 100,000 of population in New South Wales in that year was 12 and in Victoria it was 18.8. Since that time the incidence of diphtheria in the Australian States has undergone a strange variation. At first the disease became relatively infrequent. In 1900 only 726 cases were notified in New South Wales, which is equivalent to a case incidence of 0.53‰. The incidence rose steadily from 1903 to 1909, when the number of cases reached 2,419. In the following year no less than 4,989 cases were notified and in 1913, there were 6,380. In 1917 the number of cases notified was 5,805, which is equivalent to an incidence of 3.07‰; in 1918 the number of cases was 5,151 and in 1919 the number fell to 3.024. In Victoria there was the same relatively low incidence until 1910. In 1911 the disease spread rapidly and no less than 5,120 cases were notified. This is equivalent to an incidence of 3.87‰. The incidence remained at about this level for five years, to fall in 1917 to 2.91‰ and to rise again in 1918 to 4.63‰. In 1919 the incidence has again reached a level of about 3‰. The death-rate in both States has closely followed the curve of the case incidence. From the table published in another part of this issue it will be seen that in the year 1919 no less than 12,811 persons have been infected in the Commonwealth and of these no less than 550 have died. The case mortality for the whole of the Commonwealth was 4.28%. In the two largest States it was 4.2% and 4.8% respectively; in South Australia it was 5.8% and so on. What are our health authorities doing about this costly, recurring waste? We have claimed that diphtheria is preventible and yet thousands of our children and adults suffer year after year from it. The number of infections and of deaths from this disease is not diminishing. We are less well off than we were twenty years ago. From the annual reports of the six departments of public health, we fail to learn of any serious effort to deal with this problem energetically and effectively. In a few isolated areas, outbreaks have been traced to their source and means have been taken into effect complete isolation of all infective persons. Unfortunately for the Commonwealth these active measures remain limited and of small significance, save as object lessons. Not long ago the Federal Committee of the British Medical Association in Australia advocated an extension of public health activities. It was proposed that the Federal Government should lend its co-operation in a serious endeavour to attack the preventible diseases. There has been no move on the part of the Federal Government to co-operate with the State Departments of Public Health and no move on the part of the State Departments to put their houses in order with the co-ordinating aid of the Federal authority. This delay to institute a compaign which, if properly organized and administered, would result in an immediate and considerable reduction in the incidence and mortality of a devastating disease, is unpardonable. The medical profession is awakening to a sense of its duty in regard to the prevention of disease. But it is powerless to achieve success, unless the responsible authorities fulfil their obligations to the public. The State organizations have failed. It is now time to adopt the expedient suggested by the Federal Committee of invoking the assistance of Federal machinery.

STATISTICS OF INFLUENZA.

A statistical investigation of the 1918 epidemic of influenza in the State of Connecticut, United States of America, has been undertaken by Drs. C. E. A. Winslow and J. F. Rogers.[1] Records obtained from the State Department of Health show that the epidemic was by far the most serious outbreak of communicable disease from which the State had suffered since the beginning of its accurately recorded sanitary history. It has been ascertained that the annual death-rate has reached 19‰ only four times since the year 1848. The two highest annual rates on record are both 19.4‰ and are for the influenza epidemic years of 1892 and 1918. Since the normal death-rate was higher thirty years ago than at the present time, the effect of the influenza epidemic is seen to have been much more serious than that of its predecessor in any single year. The monthly death-rate for October, 1918, was equivalent to the enormous figure of 63.9 deaths per annum per thousand of population, a figure

[1] *Journal of Infectious Diseases*, March, 1920.

more than double the highest figure recorded in the earlier epidemic, 30.6 per thousand. The epidemic actually cost the State 5.5 lives per thousand of population. In order to obtain complete data in regard to morbidity and fatality from influenza a detailed house-to-house canvass was conducted by the State Department of Health. It was concluded that the proportion of the population actually affected by the epidemic varied between 200‰ and 400‰ and that the actual fatality rate was between two and four deaths per hundred patients, the higher morbidity and the lower fatality rate being more likely to be correct. The most striking fact with regard to the epidemiology of the disease was the great rapidity with which it spread throughout the community. The only condition which temporarily checked the spread of infection, was complete institutional quarantine. There is no evidence that any other method of control had any influence on its spread in the State. Many instances are recorded of schools, asylums, prisons and other institutions which maintained absolute quarantine and escaped infection, to experience a normal incidence at a later date when the quarantine was lifted or accidentally broken. The incubation period is regarded to be ordinarily about 48 hours. Direct contact transmission is looked upon as the chief agent in the spread of an outbreak. In studying the influence of age it was found that the epidemic displayed a remarkable predilection for the years of young adult life and passed lightly by the later age periods. It has been suggested that the low mortality amongst those past middle life might be due to artificial immunity acquired in the preceding epidemic of 1890-1892. Careful study of the age periods renders this contention doubtful. In regard to sex, the figures for Connecticut conform with statistics of other localities and show a distinctly heavier mortality amongst males. Greater exposure to infection and a greater tendency to keep up and about when ill are regarded as important factors in producing this result. The latter of these considerations appears to be the more important, since the incidence rate was alike for both sexes, but the fatality was materially higher amongst males.

TREATMENT OF EXOPHTHALMIC AND THYROTOXIC GOITRE.

The relative values of medical and surgical treatment in exophthalmic goître cannot be regarded as altogether satisfactorily finalized. Dr. Neil J. MacLean, in a recent discussion of this question [1] epitomizes the position by stating that there is no subject in the whole category of medicine about which there is so much diversity of opinion. The whole subject appears to be still in a chaotic state since the actual ætiology of the disease is still unknown. The importance of searching for and eliminating focal infections has been pointed out by several observers, but it is admitted that the disease may often be found to persist even after such foci have been removed.

It is a matter of common experience that medical treatment in Graves's disease has not been eminently successful, the mortality being estimated at from 11% to 30% by various writers:—In Osler's "System of Medicine" the statement is made that it is a disease from which few recover and some die. On the other hand it is admitted that not a few patients are cured and remain cured by medical treatment alone.

Amongst surgeons there is no unanimity of opinion regarding the surgical procedure to be adopted. Bilateral thyroidectomy, hemithyroidectomy, partial resections of the lobes, and ligature of the thyroid arteries have all advocates amongst eminent surgeons. It has frequently been asserted that as a result of operation a condition of myxœdema may follow as an early or late sequela. It is pointed out that very few such cases are recorded in the literature; moreover, were this a common occurrence, such a result could hardly escape observation.

In estimating the amount of gland to be left for functional purposes, recent research work at the University of Minnesota has shown that one sixth of a normal gland is necessary in the adult, one third in the growing animal.

Obviously, all treatment to be rational should be based on pathology. Further research may prove exophthalmic goître to be a hypersecretion or an altered secretion of the thyroid, or only one phase of a complex disturbance of the functions of other ductless glands. It is an important fact that the histological structure of the thyroid is invariably abnormal when the symptoms of exophthalmic goître exist and that removal of the gland leads to an amelioration or disappearance of the symptoms in the vast majority of cases.

In considering the indications for operative interference it is important to recognize that the disease commonly exhibits cyclical stages of exacerbation and remission. In the past the importance of endeavouring to select the best time at which operation should be undertaken has not been recognized. This may account in part for the high early and late mortality. The consensus of opinion appears to be that during the acute stage mental and physical rest should be rigidly enjoined, combined with medical treatment. Acute exophthalmic goître should not be regarded as a surgical emergency. It is stated that probably 50% of the patients would recover without the aid of surgery. Surgical treatment is regarded as indicated should symptoms recur, or persist for a prolonged period. The question as to whether anæsthesia should be local or general is still the subject of discussion. Treatment by irradiation of the thyroid is to be regarded as yet in the stage of investigation.

[1] *Surgery, Gynecology and Obstetrics*, November, 1919.

The Annual Convention of the Canadian Medical Association will be held in Vancouver, British Columbia, from June 22 to 25, 1920. The following societies are holding their annual meetings at the same time and in the same place: The Canadian Public Health Association, the Canadian Association for the Prevention of Tuberculosis, the Canadian Committee on Mental Hygiene, the National Committee for Combating Venereal Diseases, the British Columbia Hospital Association.

It is anticipated that the meeting of the Canadian Medical Association will be of unusual interest and importance. A large attendance of medical practitioners from Canada and the United States is expected. The Secretary of the Committee of Arrangements suggests that Australian medical practitioners may be tempted by the prospects of a good meeting to take the trip across the Pacific and to attend this convention.

Abstracts from Current Medical Literature.

DERMATOLOGY.

(160) Lupus Erythematosus.

H. W. Barber in 1915 published an account of a severe case of *lupus erythematosus* involving the face, neck, ears, scalp, hands and elbow. A practically pure culture of *Streptococcus longus* was obtained from the fæces of the patient. He now reports a case of this affection associated with streptococcal infection of the tonsils (*British Journ. Dermatol. and Syphilis*, October-December, 1919). The patient, a girl of 25 years, presented on examination symmetrical red patches of *lupus erythematosus* on the cheeks of the size of a five shilling piece, symmetrical scaly patches on the temples and the pinnæ of the ears, together with a small scaly patch on the scalp. The tonsils were considerably enlarged and appeared septic, while the glands at the angle of the jaw on each side were easily palpable. Examination of the fæces gave on cultivation a number of colonies of a short-chained streptococcus, which were very slightly agglutinated by the patient's serum. A swab from a tonsillar crypt gave a pure culture of a long-chained streptococcus, from which an autogenous vaccine was prepared. The tonsils were removed and the autogenous vaccine was given. A slight rise of temperature followed, together with an acute exacerbation of the skin condition, which persisted off and on for two months, when an examination of the throat showed the palate to be swollen and dark red in colour and the lymphoid tissue of the pharynx and naso-pharynx, which still remained, to be inflamed and covered with points of yellowish exudate, such as is seen in follicular tonsillitis. A culture taken from one of these points gave a growth of many chains of *Streptococcus longus*. Later the remaining lymphoid tissue at the back of the throat was removed and a sensitized vaccine given. This was soon followed by a cessation of all signs of activity in the skin lesions.

(161) Schamberg's Disease.

H. G. Adamson describes the common features of a dermatosis, which was first reported by Schamberg under the title of a "peculiar progressive pigmentary disease of the skin." He adds to the already published cases five other cases, making a total of twelve reported cases in all (*British Journ. Dermatol. and Syphilis*, October-December, 1919). The sites of predilection are the legs below the knees, but sometimes also above the knees and sometimes on the arms and wrists. In all cases males have been affected, the ages varying from 11 to 74 years. Subjective symptoms are absent or insignificant. The eruption, which is slowly progressive, begins as a group of reddish-brown punctæ (described as cayenne pepper-like punctæ); these coalesce or become joined up by a paler intermediate pigmentation, so that eventually there is formed a reddish-brown macule, studded with deeper red points and with an extending margin of isolated punctæ. There may be few or many such macules or they may coalesce into large sheets, or extend until the limb is almost completely covered. The occurrence of the eruption on the forearms and wrists excludes the explanation proposed by some that it is a mere pigmentation from vascular congestion associated with long standing and with varicose veins. Microscopical examination of the lesions have been made by Schamberg, by Adamson, by Kingery. All are agreed as to the inflammatory nature of the lesions and the presence of dilated blood vessels with endothelial proliferation.

(162) The Treatment of Thyro-Toxicosis.

G. W. Holmes and A. S. Merrill have carried out investigations into the effects of irradiation of glandular structures (*Journ. Amer. Med. Assoc.*, November 29, 1919). These experiments have shown that glandular structures can be destroyed by radium and Röntgen rays without the over-lying skin being destroyed. Results can be produced equal to those of the surgeon in the treatment of such conditions as hyperthyroidism. The authors' experience of radiotherapy in thyro-toxicosis corresponds with that of other workers, such as Stoney, Pfahler, Zulick, Means and Aub. Interrupterless transformers and Coolidge tubes are used and the tube is worked at a 20 cm. parallel gap. Aluminium filters of 4 millimetres and a leather filter of 1 millimetre are used and the distance from the target to the skin is 20 centimetres. Three areas are treated at each sitting and two-thirds of an "erythema dose" is the amount of radiation given to each area. The three areas are (*i.*) right side, (*ii.*) left side, (*iii.*) thymus. The patient then rests for three weeks when the dosage is repeated. After a further interval of three weeks, a third dose is administered. No further dosage is to be given for three months, when a second course is given. In very rare cases a third series may be necessary. The dangers in treatment are telangiectasis and hypothyroidism, but if the technique described be followed, there is very little risk of such complications. Rest in bed during the first applications is of advantage. Patients with extreme toxæmia respond quickest to treatment. Relief follows the first dose and the pulse-rate falls and weight is gained. After six months, the patients can resume their normal life.

(163) X-Ray Treatment of Skin Diseases.

F. Wise (*Journ. Amer. Med. Assoc.*, November 15, 1919), dealing with the X-ray treatment of wide-spread and generalized skin diseases, refers to modern methods which have been introduced which tend to exactness in Röntgen therapy and allow of an accurate dosage of X-rays of known quality. By means of a transformer apparatus and Coolidge tubes the settings for the production of a dosage of one Holzknecht unit are as follows:—Parallel gap 15 cm., current in tube 2 milliampères, skin distance 20 cm., exposure three minutes. Hard rays are preferable to soft rays in the treatment of all skin lesions. Repeated fractional dosage should be employed and too large a body area should not be exposed at one sitting; one-eighth to one-quarter of an Holzknecht unit (5H equals Sabouraud B.) is sufficient. Wise describes tube distances in order to obtain equal dosage over large irregular areas. Two groups of dermastoses are recognized:—(*a*) those in which a lasting amelioration or cure is to be expected, and (*b*) those in which only a temporary subsidence or amelioration is expected. Group (*a*) includes *lichen planus*, seborrhœic dermatitis, various eczemas, *pityriasis rosea*, acne, prurigo. Group (*b*) includes *psoriasis, pityriasis rubra, dermatitis exfoliativa, mycosis fungoides* and other dermatoses with a tendency to involve large areas. Very few lesions fail to show improvement after an application of a Holzknecht dose, given fractionally. In pruritic lesions, the itching is relieved after two or three applications.

(164) Some Experiments With Coolidge Tubes.

Martin and Holmes (*Amer. Journ. Röntgenol.*, October, 1919) describe a series of experiments planned to show the differences in action of the four types of Coolidge tubes, *viz.*:—radiator, fine focus, medium focus and broad focus. The experiments were carried out by photographing a lumbar vertebra embedded in paraffin block 1.25 to 1.5 cm. thick. A radiogram was obtained practically identical with that of a radiogram through living tissue. An interrupterless transformer was used. The results of the experiments are summarized as follows:—(*i.*) Variation of size of focal spot does not cause any variation in photographic effect, as long as all the other conditions are constant. (*ii.*) When a given standard definition is to be obtained, the exposure time is always approximately the same, regardless of the size of the focal spot, if the tubes are operated at the maximum rated milliampèrage and tube distances are properly adjusted. (*iii.*) The minimum distance at which the best definition is obtainable is directly proportional to the size of the focal spot. (*iv.*) The 10 milliampère tube used with a screen at 65 cm. distance, gives better definition in less time than a broad focus tube carrying 80 milliampères at the same distance without a screen.

(165) Injection Medium for Radiography of Fistulæ.

Neil MacLeod describes a new medium for the injection of sinuses and fistulæ in order to outline them and show their course and origin (*Archives of Radioth. and Electrotherap.*, November, 1919). The most popular medium, hitherto, has been Beck's paste or some

similar greasy preparation which is but little fluid, even when heated. The new medium recommended is composed of bismuth oxychloride one part and mucilage of acacia two parts. This is mixed into a paste and water added to make five parts. This medium gives excellent radiographic shadows.

BIOLOGICAL CHEMISTRY.

(166) Quantitative Estimation of Indol.

H. F. Zoller describes a method for the quantitative estimation of indol in biological media. (*Journ. of Biological* Chemistry, January, 1920). The method used depends on the formation of nitro-indol and the extraction of this substance with isoamyl or isobutyl alcohol. In most of the methods previously employed steam distillation of the indol containing solution has been resorted to in order to remove interfering substances. The author finds that by adjusting the reaction of the medium to a P_H of 9.2, the point where phenolphthalein shows the medium of intensity of red violet colour and thymolphthalein fails to show a visible blue colour, the indol can be completely recovered by direct distillation of 75% of the contents of the distilling flask. For the determination of indol standards are prepared by adding to a series of tubes 0.02, 0.04, 0.06 mg. and so on of indol making up to 10 c.cm. with water. To each tube are added two drops of 1% solution of sodium nitrite and five drops of concentrated sulphuric acid and the tubes shaken. After standing for five minutes each tube is extracted with three portions (3. c.cm. each) of isoamyl or isobutyl alcohol and the extracts mixed and made up to 10 c.cm. with the pure extractant. An aliquot part of the distillate from the indol separation is pipetted into a test tube and treated in the same manner as the indole standard. The colours are then compared. With a little practice it is possible to interpolate very accurately between successive 0.02 mgr. standards by matching the relative intensity.

(167) Total Chlorides and Free Acidity of Gastric Juice.

Seymour J. Cohen has investigated the relation between the total chlorides and the free acidity of the gastric juice (*Journ. of Biol. Chemistry*, February, 1920). It appears that the chlorides of gastric juice are secreted at a more or less constant rate and in all likelihood independently of the hydrochloric acid secretion. In other words there may be as high a percentage of total chlorides in a sample of gastric juice when the free acidity is 0.0 as when it is 0.35%. This may indicate that the hydrochloric acid is not secreted as such, but is probably formed by the secretion of some substance, containing the chlorine ion, which is transformed in the lumen of the stomach or by stomach mucosa to the free acid. If free hydrochloric acid were secreted as such by the gastric glands, a decrease in the free acidity or a total absence of the free acidity would be associated with a marked fall in the total chlorides, but this does not seem to be true. On the other hand the apparent constant rate of secretion of chlorides may mean that the gastric juice is secreted with a constant acidity and that variations in the end-product are due to neutralization by mucus or the alkalinity of the stomach mucosa. There is also a relation between the volume of the gastric juice and its acidity. A large volume secreted rapidly has a greater acidity than a smaller volume secreted slowly, other factors remaining constant. The free acidity is almost directly proportional to the total volume.

(168) Availability of Carbohydrates in Certain Vegetables.

W. H. Olmsted has investigated the availability of the carbohydrates of certain vegetables used in the diet of patients suffering from diabetes (*Journ. of Biological Chemistry*, January, 1920). The recorded analyses permit only a doubtful calculation of the desired information, because among other reasons much of the carbohydrate is "fibre" which presumably is not digested or absorbed by man. Furthermore, published analyses usually give carbohydrate as determined only by difference and the combined errors thus fall on this constituent. The vegetables were boiled and treated with takadiastase and the sugar determined by Bertrand's method. Experiments were also done with phyloridzinized animals and the extra sugar calculated from the average of the D-N ratios of the periods before and after feeding with the prepared vegetables. Cabbage boiled in the ordinary way was found to have 4.4% of available glucose by the takadiastase method and 5% in the phloridzinized dog. Thrice boiled cabbage, prepared according to Joslin, showed 0.4% and 0.5% respectively. Cauliflower gave 2.8% and 3.4% respectively, and thrice boiled cauliflower 0.8% by both methods. Spinach gave 1.2% in the phloridzinized dog and lettuce 1% by the takadiastase method.

(169) The Detection of Tryptophane in Urine.

W. A. Fearon has noticed the colours produced on adding strong sulphuric acid to urine while performing Kjehdahl estimations and as a result of his investigations as to its causation he gives a test for tryptophane in urine (*Dublin Journ. Med. Science*. March, 1920). He found that on adding a very small quantity of carbazole to strong sulphuric acid and then adding to the mixture a drop of urine, if nitrites be present a deep green colour will develope. The ordinary colour tests for trytophane are inapplicable to urine on account of the other indol bodies present, but tryptophane is able to condense with glyoxylic acid in the presence of sulphuric acid to give a body very similar to carbazole and this body gives a green nitroso derivative like that of carbazole. As a general method, 50 c.cm. of urine are evaporated to dryness on the water bath. If any free indol be present, it will be driven off with the steam. The residue is then extracted with 10 c.cm. of the glyoxylic reagent in the cold and one drop of the extract is added to 5 c.cm. of pure sulphuric acid and warmed gently; the development of a green colour indicates the presence of tryptophane or tryptoamine. Tryptophane is not of common occurrence in urine. Sufficient data has not yet been collected for the publication of its percentage presence in various disorders.

(170) The Neutrality of the Blood.

W. M. Bayliss (*Journ. Physiol.*, December, 1919) has investigated the effect on the hydrogen ion concentration of the blood of the injection of large quantities of acid into the circulation and discusses generally the conditions which maintain the constancy of the H-ion concentration in the blood and the parts played by bicarbonates and plasma proteins in the maintenance of this constancy. Intravenous injections of acid in sufficient quantity to neutralize half the bicarbonate in the blood does not increase the H-ion concentration of the plasma. The chief mode of compensation is by increase in pulmonary ventilation and consequent decrease in the carbon-dioxide in the blood. Renal excretion of acid and ammonia production by the liver do not appreciably come into play in short experiments. Alkali injected is not so readily neutralized. The chief agent in this case appears to be the excretion of alkaline urine. The proteins of the plasma play no perceptible part in the maintenance of neutrality between the limits of H-ion concentration possible in the living organism, namely, below 10^{-4} or above 10^{-10} normal. When neutral red is used as an indicator, which changes colour at or near the neutral point, a solution of serum proteins freed from bicarbonates by dialysis behaves like 0.9% sodium chloride towards acids, so that the proteins of serum will not combine with so small amount of acid as would make the solution 0.0004 normal at or near the neutral point. Serum in equilibrium with bicarbonate behaves like the bicarbonate solution devoid of protein within the limits referred to. All carbon-dioxide can be removed from serum by bubbling air freed from carbon-dioxide through it, but it is incorrect to describe the phenomenon, as is often done, as a driving off of carbon-dioxide by the proteins acting as acids. The carbon-dioxide is removed by the air, the bicarbonate converted into carbonate, which is hydrolyzed, the alkalinity is sufficient to insure combination of sodium hydrate with the protein and more sodium hydrate continues to be produced, until all the carbonate is decomposed. No evidence was obtained that either sodium bicarbonate or serum proteins, or both together, convey carbon-dioxide from the tissues to the lungs. The only function of the sodium bicarbonate in the blood is to regulate the H-ion concentration, while, under normal conditions the only function of the proteins is to give a colloidal osmotic pressure and a moderate degree of viscosity to the plasma.

British Medical Association News.

ANNUAL MEETING.

The annual meeting of the Western Australian Branch was held at the Perth General Hospital on March 17, 1920, Dr. F. A. Hadley, the President, in the chair.

Annual Reports.

The Honorary Secretary read the annual report of the Council for the year 1919-1920. The report was received and adopted.

The Honorary Treasurer read the financial report, which was also received and adopted.

The Honorary Treasurer advocated that the sum of £150 should be invested in a suitable manner. He suggested that 5% War Loan Bonds be selected for this purpose.

Dr. J. J. Holland moved that this be carried out and Dr. H. J. Lotz seconded the motion. The motion was carried.

Election of Office-Bearers.

Dr. Hadley announced the result of the election of office-bearers and members of the Council for the ensuing year as follows:—

President: Dr. A. T. White, C.M.G., V.D..
Vice-President: Dr. G. W. Barber, C.B., C.M.G., C.B.E..
Honorary Treasurer: Dr. W. Trethowan.
Honorary Secretary: Dr. C. H. Shearman.
Members of Council: Dr. D. P. Clement, Dr. R. C. Merryweather, Dr. E. A. Officer.
Members of Ethical Committee: Dr. D. P. Clement, Dr. R. C. Merryweather, Dr. E. A. Officer.
Honorary Auditors: Dr. M. K. Moss, Dr. A. E. Randell.

Induction of President.

Dr. Hadley introduced the new President, Dr. A. T. White, and vacated the chair in his favour.

Dr. White thanked the members for having placed him in the honoured position of President. He extended a hearty welcome to those members who had recently returned from active service abroad. He referred to the importance of active steps being taken to recognize and treat certain diseases which had been brought into the State by returned soldiers. Malaria and bilharziosis were especially mentioned. Unless vigilance were shown, these diseases would spread throughout the State.

The Work of the Council.

Dr. J. J. Holland commented on the action of the Council during the past year in connexion with the Medical Defence Fund. He thought that it reflected on the members of the Council, not as members of the Branch, but as representatives of the medical profession, that nothing had been done in this respect.

The President pointed out that, as this matter had not been included in the annual report of the Council, it could not be discussed at that time.

Dr. T. L. Anderson stated that a Medical Defence Union had been inaugurated and was actually still in existence.

Ethical Rules.

The meeting then considered some proposed amendments of the Ethical Rules. A number of resolutions were carried.

SCIENTIFIC.

A meeting of the Queensland Branch was held in the B.M.A. Rooms, Adelaide Street, Brisbane, on April 9, 1920, Sir David Hardie, the President, in the chair (see *The Medical Journal of Australia*, May 1, 1920, page 422).

Dr. J. J. Power, D.S.O., read a paper on blood transfusion (see page 440).

Dr. E. Culpin said that he considered that blood transfusion was of value in cases of prolonged sepsis. He thought that it would prove especially useful in puerperal sepsis.

Dr. J. V. Duhig stated that transfusion was indicated in cases of prolonged sepsis with hæmolysis, especially in streptococcal puerperal sepsis. He did not favour Rendle Short's method of testing the blood of donors; he described a modification he had found useful. Transfusion should never be performed unless a preliminary examination of the donor's blood had been made.

Dr. A. P. Murphy described the methods adopted by resuscitation teams.

Dr. A. Graham Butler, D.S.O., claimed that the organization of resuscitation teams had been due to Australian initiative. He asked Dr. Power to inform him of his experience with gum solution. It should be easier to obtain gum solution than blood, especially for maternity cases. He exhibited a photograph of the latest type of dressing station and gave an account of the methods employed by resuscitation teams.

Dr. Alex. Marks, D.S.O., spoke of the work carried out at casualty clearing stations. He stated that *rechauffement* was in many cases more important than immediate blood transfusion.

Dr. D. A. Cameron mentioned the various methods of blood transfusion. He thought that too great importance had been placed on transfusion in the front areas. In his opinion immediate transfusion should be reserved for selected cases. For the majority of patients it was better to secure warmth and time to recover from shock. He thought that the present methods were too complicated and that the whole matter was somewhat over-done.

Dr. E. S. Meyers said that transfusion was very useful after the patient had been revived by warmth and rest. He described the method carried out in field ambulances and aid posts.

Dr. A. V. Meehan inquired if it had been possible to perform transfusion in the advanced dressing stations during a battle. In 1917 it would have been quite impossible to have carried out Dr. Power's technique except during a quiet period.

Dr. C. S. Hawkes described the work that he had seen in the London hospitals. Transfusion had been used much too freely in many hospitals. He thought that gum solution was just as good as blood for injection. Blood transfusion meant that a man in good health became incapacitated for several weeks after serving as a donor.

In his reply Dr. Power thanked the members for the interesting discussion. Gum acacia was used in addition to blood in cases of shock. He considered that the citrate method was the best for civil practice. The object of blood transfusion was to restore the oxygen capacity of the blood. This could not be done by injecting solutions of gum or of common salt.

The undermentioned have been elected members of the Victorian Branch:—

Jeffrey Wilmott Wilkinson, Esq., M.B. *et* Ch.B., 1914 (Univ. Melb.), Albury.
William Edward Harrison, Esq., M.B. *et* Ch.B., 1919 (Univ. Melb.), Bendigo.
Frank Longstaff Apperly, Esq., M.R.C.S. (Eng.), L.R.C.P. (Lond.), 1915, M.B. *et* Ch.B. (Oxon.), 1916, University of Melbourne.

The undermentioned have been elected members of the Queensland Branch:—

Stanley Vincent O'Regan, Esq., M.B., 1915 (Univ. Sydney).
A. V. Day, Esq., M.B. (Univ. Sydney).

The undermentioned have been nominated for election as members of the New South Wales Branch:—

Charles Robert Smith, Esq., M.B., Ch.M., 1920 (Univ. Sydney), "Newton," Hipwood Street, North Sydney.
Beaumaris William Stevenson, Esq., M.B., Ch.M., 1920 (Univ. Sydney), "Elma," William Street, Randwick.

Naval and Military.

APPOINTMENTS.

The following appointments, etc., have been notified in the *Commonwealth of Australia Gazette*, No. 38, of April 29, 1920:—

Australian Imperial Force.

APPOINTMENTS TERMINATED.

First Military District.

Colonel R. B. Huxtable, C.M.G., D.S.O., V.D., 25 April, 1920.
Major A. J. Kelsey, 18th May, 1920.

Second Military District.

Lieutenant-Colonel B. C. Kennedy, 19th April, 1920.
Major J. McPherson, 27th April, 1920.
Major W. J. Connolly, 3rd May, 1920.
Major H. E. Browne, 1st April, 1920.
Captain J. G. M. Beale, 2nd April, 1920.

Captain C. W. W. Murray, 12th April, 1920.
Captain L. Bamber, 6th February, 1920.
Captain W. Wood, 28th March, 1920.
Captain T. E. Marshall, 4th May, 1920.

Third Military District.

Colonel J. M. Y. Stewart, C.B.E., D.S.O., 8th May, 1920.
Major A. Cook, O.B.E., 21st April, 1920.
Major F. F. McMahon, 12th April, 1920.
Major W. H. Collins, D.S.O., 9th April, 1920.
Captain E. I. Littlejohn, 2nd April, 1920.
Captain A. E. Burke-Gaffney, 12th March, 1920.
Captain A. H. Baldwin, 4th April, 1920.
Captain F. McCallum, 18th March, 1920.
Captain H. Crawford, 29th February, 1920.
Captain A. Barbeta, 5th March, 1920.
Captain R. J. Murphy, 8th March, 1920.
Captain M. McKenna, 28th February, 1920.
Captain W. A. Graham, 12th March, 1920.
Captain W. F. Stephens, 12th March, 1920.
Captain H. W. Savige, 12th March, 1920.
Captain A. J. Day, 2nd March, 1920.
Captain J. F. Chambers, 3rd March, 1920.

Fourth Military District.

Captain J. S. Proctor, 3rd April, 1920.

Australian Military Forces.

APPOINTMENTS, PROMOTIONS, ETC.

First Military District.

Australian Army Medical Corps—

The temporary rank of Lieutenant-Colonel granted to Provisional Captain (Honorary Major) N. M. A. Alexander is terminated, 26th February, 1920.

Captain G. G. O. Phillips to be retired, under the provisions of Australian Military Regulation 158 (*h*), 1st April, 1920.

Australian Army Medical Corps Reserve—

Honorary Major H. C. Garde to be transferred to the Retired List with the rank of Major, and with permission to retain such rank and wear the prescribed uniform, 1st April, 1920.

Honorary Major J. Booth-Clarkson to be retired, under the provisions of Australian Military Regulations 158 (*h*), 1st April, 1920.

Second Military District.

Australian Army Medical Corps—

The age for retirement of Lieutenant-Colonel (Honorary Colonel) the Honourable J. L. Beeston, C.M.G., V.D., to be extended until 31st December, 1920.

Third Military District.

Australian Army Medical Corps—

Captain F. F. McMahon to be transferred to the Reserve of Officers, and to be Major, 1st April, 1920.

Captain H. B. Thomson to be transferred to the Reserve of Officers, 1st April, 1920.

Fourth Military District.

Australian Army Medical Corps—

Captain (provisionally) F. W. Noble to be transferred to the Australian Army Medical Corps Reserve, and to be Honorary Captain, 1st March, 1920.

The resignation of Captain R. D. Brummitt of his provisional appointment is accepted, 1st March, 1920.

Australian Army Medical Corps Reserve—

Richard Longford Thorold Grant to be Honorary Captain, 1st February, 1919.

Honorary Colonel W. T. Hayward, C.M.G., O.B.E., to be transferred to the Retired List, with rank of Colonel, and with permission to retain such rank and wear the prescribed uniform, 1st April, 1920.

The resignations of Honorary Captains J. W. Clayton and J. A. Bonnin of their commissions are accepted, 19th February, 1920.

Fifth Military District.

Australian Army Medical Corps—

The resignation of Captain B. G. Quinlan of his provisional appointment is accepted, 10th February, 1920.

Australian Army Medical Corps Reserve—

Honorary Captain H. B. Gill to be granted the temporary rank and pay of Major whilst employed as Specialist at No. 8 Australian General Hospital, 4th March, 1920.

To be Honorary Captain—

James Vere Arkle, 1st April, 1920.

The commission of Honorary Captain H. R. Day is cancelled under the provisions of Section 16 of the *Defence Act*.

Sixth Military District.

Australian Army Medical Corps—

Captain E. Bretingham-Moore to be transferred to the Reserve of Officers, 1st March, 1920.

To be Captain—

Honorary Captain W. I. Clark, M.C., from the Australian Army Medical Corps Reserve, 1st March, 1920.

On February 29, 1920, a meeting of medical practitioners was held at Clare, South Australia, for the purpose of discussing the conditions of friendly society practice and the agreement with friendly societies. At this meeting it was resolved to form a local medical society, to be called the Mid-Northern Medical Association of South Australia. It was further resolved that Dr. O. W. Smith be elected the first President and that Dr. G. Wien Smith be appointed Honorary Secretary and Treasurer.

The Mid-Northern Medical Association has applied for affiliation with the South Australian Branch of the British Medical Association and it is anticipated that the Branch will approve of this arrangement within a short time.

We are requested to announce that all medcal practitioners residing in the northern districts of South Australia, who are members of the British Medical Association, are eligible for election as members. Those desiring to join are asked to communicate with Dr. G. Wien Smith, the Honorary Secretary and Treasurer, "Windybrae," Clare, South Australia, as soon as possible.

THE MEDICAL PRACTITIONERS ACT, 1919, SOUTH AUSTRALIA.

The regulations made under the *Medical Practitioners Act, 1919*, of South Australia have been published in the *South Australian Government Gazette*, No. 21, of April 29, 1920. The first eleven paragraphs deal with the nomination of members of the Board by persons registered under the Act. The nomination has to be signed by the person making it and the Registrar is required to publish the nomination three times in at least two daily newspapers within the State. If more than one person is nominated to fill one vacancy, an election by ballot papers is required.

The twelfth regulation determines that all persons who become registered and who pay a registration fee of £1 1s. shall receive a certificate of registration. The following two regulations deal in a similar manner with the renewal certificates and with certificates for contnuous registration. In the schedule are set out the various forms to be used.

BROKEN HILL AND DISTRICT HOSPITAL.

The annual report of the Broken Hill and District Hospital for the year 1919 reveals that the Hospital has been passing through a highly critical period. The miners' strike robbed the institution of much of its usual financial support, while the influenza epidemic led to a considerable augmentation of the necessary expenditure. The total amount spent on maintenance, minor addition and repairs and miscellaneous items was £22,858. The sum of £1,115 was brought over from the previous year. The income from the Workers' Contribution Fund amounted to £3,832; subscriptions, donations and the like yielded £1,909, while a further £900 were received as fees from patients. In addition to the £6,641 referred to above, the Government contributed £12,873, including the ordinary subsidy, a special grant and a grant from the Country Influenza Board. The total income, including miscellaneous moneys received, aggregated £20,334, which is £2,525 less than the amount expended.

Statistics.

On the first day of the year there were 88 persons in the Hospital. During the 12 months 1,509 persons were admitted. The number of persons discharged was 1,293, of whom 1,055 were entered as discharged cured. There were 200 deaths. The death-rate, calculated in the usual manner, was 13.32%. Fifty-six patients died within the first day of admission. The average number of patients within the Hospital within a given time was 100.23. There were 1,098 out-patients, of whom 277 were treated for accidents.

The number of those admitted into the Hospital during the past five years has increased steadily from 1,142. It is curious to note that the death-rate has also increased more or less regularly. In 1915 it was 9.2%. In the following three years it was 11.03%, 10.37% and 12.69% respectively. These rates, however, appear to have been calculated not according to the Registrar-General's formula, but as percentages of the number of persons discharged.

Influenza.

Early in the year the members of the medical staff and the Matron consulted the Chairman of the Hospital in regard to the precautions to be taken in the event of an outbreak of influenza in Broken Hill. It was decided that the patients in the infectious diseases ward should be transferred to the children's medical ward. This liberated 30 beds and provision was made for an additional 20 beds in the adjoining verandahs. The Health Department was informed that when the isolation ward was full, further accommodation for patients would have to be found elsewhere. The Health Department was prepared to open the Drill Hall. On April 23, 1919, the first patient with influenza was admitted. Within a short time the ward was filled. The total number of patients admitted suffering from influenza with or without pneumonic complications was 347. There were 71 deaths. Many members of the medical and nursing staffs, including the Surgeon-Superintendent, became infected. Fortunately, none of them died. The strain was therefore greatly increased by the temporary diminution in the number of nurses. The epidemic reached its height in July, during which month 97 persons were admitted. In August there were 52 patients, in September 47 and in October 49. In November there were only four patients with influenza and in December only two.

Diphtheria.

The total number of patients suffering from diphtheria was 52, while two patients were suffering from croup. There were four deaths. Dr. G. H. Burnell, in his capacity as Acting Surgeon-Superintendent, has undertaken a systematic control of the school children in the endeavour to check the spread of diphtheria in the district. Dr. Burnell has had the able assistance of Sister Cook in the laboratory. A bacteriological examination was carried out on the throats of all the children attending the Broken Hill schools. Those children who were found to be carriers of the diphtheria bacillus, were admitted for treatment. Dr. Burnell publishes a chart showing the incidence of diphtheria among the patients admitted to the Hospital in 1917, 1918 and 1919. From this chart it is seen that a small reduction of infections occurred in 1918 and a great reduction in 1919 of the number of infections. We congratulate Dr. Burnell and those associated with him in this admirable piece of preventive medicine. In addition, the milk supply is being controlled and arrangements have been made for the introduction exclusively of controlled milk from the beginning of the current year.

Venereal Diseases.

In 1918 it was determined to open a clinic for venereal diseases in male patients. During the course of the year 36 new patients were admitted, while 30 patients were under treatment at the beginning of the year. A cure is said to have been effected in 26 instances. No details, however, are given in regard to the standard of cure. Twenty patients ceased attendance while still in the infective stage of disease. It is anticipated that a clinic for female patients will be opened in 1920.

Enteric Fever.

The total number of persons suffering from enteric fever was 38, of whom 34 were admitted during the year. There were four deaths. In 1915 there were 90 patients admitted on account of this disease and in 1916 100. The number of cases has diminished rapidly since that time.

Other Infective Diseases.

There were 17 cases of scarlet fever, with one death; three cases of epidemic cerebro-spinal meningitis, with two deaths; 69 cases of lobar pneumonia, with 14 deaths, and five of broncho-pneumonia, with three deaths. It is interesting to note that in 1918 the number of persons suffering from pneumonia was more than double that of either 1917 or 1919. Whether this increase had any relation to influenza or not, it is impossible to state.

The report contains a considerable amount of further information, largely dealing with the accommodation provided for the patients, with the need for further extension, with the equipment of the Hospital and with sundry domestic matters.

We regret to announce the death of Dr. William Houston Low, of Greta, New South Wales, which took place on April 25, 1920.

It is announced in the *Tasmanian Government Gazette* that Dr. Emanuel Sydney Morris has been appointed Chief Health Officer of the Department of Public Health. His duties began on May 1, 1920. The position has been vacant for a considerable time. Since the resignation of Dr. C. L. Park, Dr. A. H. Clarke has been acting temporarily. The salary attached to the position is £750 per annum. Dr. Morris is a Sydney graduate, having taken his degree in 1911. He has been holding the position of Medical Superintendent at the Mental Diseases Hospital at New Norfolk.

Correspondence.

THE PRACTICAL SIGNIFICANCE OF THE WASSERMANN REACTION.

Sir: Dr. H. C. Colville in *The Medical Journal of Australia* of April 24, 1920, asks, under this heading, four questions. My answer to Nos. 1, 2 and 3 and to the first part of No. 4 is "no"—to the second part of No. 4, "yes," provided (*a*) that there is no history or sign of syphilis, or (*b*) that any such infection has been well treated and there has been no recurrence of the clinical signs.

I agree with McDonagh (*Practitioner*, January, 1920, p. 18) that "a negative Wassermann reaction means nothing, while a positive is only strong presumptive evidence that the patient has had syphilis. A positive reaction does not necessarily mean that the lesion in question is syphilitic, nor that he requires treatment. A positive reaction may be an indication of the patient's protective action against the disease. . . Clinical observation and experience are the only reliable guides when it comes to a question of deciding whether the patient has an active lesion or not, whether further treatment is required or not, and whether a patient is fit to marry or not. As a very large number of syphilitics, for the remainder of their earthly existence, give a positive Wassermann reaction, which is uninfluenced, or only temporarily influenced, by treatment, more good can be done by telling the patient that the reaction is useless as a guide to treatment than by prescribing an unlimited number of courses of arseno-benzene."

This appears to be the view taken also by many American physicians, certainly by those of the Massachusetts General Hospital in their "Case Records."

After three and a half years' work in the laboratory at No. 5 Australian General Hospital, I am convinced that a positive reaction is a very useful sign of syphilis only when considered in conjunction with the clinical signs; but that a "partial," "feeble partial," or "incomplete" lysis, is of diagnostic value only when following or followed by a "positive."

In regard to the specificity of the test, it must be remembered that Noguchi failed to get positive reactions in cases of clinical syphilis when using a pure culture of *T. pallidum* for the preparation of his antigen; whereas the now commonly used heart-extract antigen gives the highest percentages of positives in clinical syphilis. It seems that the test detects the presence in the blood of a lipoidophile substance which is produced in excess in syphilis, but which is produced in moderate quantities in protozoal diseases such

as yaws, sleeping sickness and malaria, in which, as in syphilis, it is the protective substance called out to combat the infection. It may be produced in other infections in quantities too small for detection by the Wassermann technique, except occasionally, when we get these puzzling partial reactions.

Yours, etc.,

ROY F. WATSON.

294 Glenferrie Road,
Hawthorn,
Victoria.
(Undated.)

THE B.M.A. BUILDING, SYDNEY.

Sir: I am informed that an opportunity has arisen for the New South Wales Branch of the British Medical Association to dispose of the property, where is its present headquarters, and which has never been an altogether satisfactory location from the point of view of the profession. Surely no effort should be spared to remove the home of the B.M.A. from a noisy commercial quarter to its proper environment, which should undoubtedly be Macquarie Street, which is almost entirely given over to professional purposes. There is, moreover, a crying necessity for additional professional rooms in this quarter; the shortage is so acute that those members of the profession who practise in this street are now entirely at the mercy of their landlords. Rents have been raised in some instances to nearly double the rates prevailing a few months ago. Were the Association to secure land in Macquarie Street and to erect extensive premises thereon, it would not only have an unimpeachable investment and a satisfactory situation for its headquarters, but it could, by letting out its surplus accommodation as professional rooms to its members, do much to alleviate the present shortage and to bring about a reduction in the exorbitant rates that are now being charged to the long-suffering medical tenants.

Yours, etc.,

LENNOX G. TEECE.

Macquarie Street,
April 28, 1920.

THE LABORATORY AND THE CLINIC.

Sir: I am sorry my friend, Professor Osborne, should have interpreted my innocent remark as to "the danger of importing the lore of the laboratory into the operating room" in the way he has. Perhaps my best answer will be to refer him to my Presidential Address in the Surgical Section of the Auckland Congress in 1914, published in the *Australasian Gazette* of February 21, 1914. It was entitled "Lister, the Laboratory and the Bedside" and a perusal of it would surely cause the learned professor to think that he may have been a little hasty in his letter in your last issue. The burden of part of the address was to show among other things how keenly alive Lister was to "the danger of importing the lore of the laboratory into the operating room." There is not the slightest reflection upon the value of physiological study implied in this statement correctly interpreted. It is only one of numerous ways of expressing that which all recognize as the worst stumbling block that besets the practice of medicine, *viz.*, our human proneness to make the patient fit the theory, instead of making the theory explain the patient.

There is nothing more common and nothing more fatal than failure or inability to make this fine distinction. It, more than anything else, is the root cause of inefficiency and falure in medical men of otherwise good ability. It should be rubbed into every student, by every clinical teacher, on every occasion and the main attribute of a good clinical teacher is that he does this. The teacher of physiology should do it also and it would greatly add to his influence for good. I could hardly have been more astonished had I been suddenly attacked from an unexpected quarter by reason of a chance remark deprecating lying or stealing.

Yours, etc.,

R. HAMILTON RUSSELL.

Melbourne,
(Undated).

EXCISION OF URETHRAL STRICTURE.

Sir: Both Mr. Harris and Mr. Morton in their letters on the above subject seem to me to be rather confusing the issues. The question is as to the necessity for supra-pubic drainage as a preliminary to operation for stricture, not for prostatectomy. I maintain with all deference to those two gentlemen that the cases are widely different. In stricture the patients are usually much younger and, in my experience, it is rare to find them desperately ill and unfit to stand a prolonged perineal operation. Of course, in the case of an old man passing urine of persistently low specific gravity and with all the other uræmic signs of advanced "surgical kidney," by all means let a supra-pubic drainage be done, if it is thought desirable; but that clinical picture in association with stricture is extremely rare and personally I do not remember ever to have seen it. I cannot, therefore, argue with Mr. Morton's conclusion that "in many, if not in all, cases (of excision of stricture) it should be combined with a preliminary supra-pubic drain." My contention is that as the excision operation involves perineal drainage of the bladder, it is certainly not necessary to do a preliminary supra-pubic operation in cases of stricture; and in support of that view I quoted the results obtained by Young in the infinitely worse and more critical cases of prostatectomy, where the perineal operation with subsequent perineal drainage of the bladder was done in a single sitting. Young quotes a series of 146 consecutive cases of perineal prostatectomy with only one death. (It is true this was in 1908, but I am not aware that humanity has changed physically since that date.) Of this series of 146, only 39 were under 60 years of age and a large number were desperately ill. In the face of facts such as these, will Mr. Morton and Mr. Harris still maintain that in the infinitely less unfavourable conditions met with in a series of stricture operations, preliminary supra-pubic drainage is catered for.

Yours, etc.,

R. HAMILTON RUSSELL.

Melbourne.
(Undated).

Books Received.

RAMBLING RECOLLECTIONS: AN AUTOBIOGRAPHY, by A. D. Rockwell, M.D.; 1920. New York: Paul B. Hoeber; Royal 8vo., pp. 332, illustrated. Price, $4.

A TEXT-BOOK OF OPHTHALMIC OPERATIONS, by Harold Grimsdale, M.B., F.R.C.S., and Elmore Brewerton, F.R.S., Second Edition; 1920. London: Baillière, Tindall & Cox; Demy 8vo., pp. 438, illustrated by 129 figures. Price, 18s. net.

Proceedings of the Australian Medical Boards.

VICTORIA.

The undermentioned have been registered, under the provisions of Part I. of the *Medical Act, 1915*, as duly qualified practitioners:—

Adey, Charles William, M.B., B.S. (Melb.), 1920, 66 Blessington Street, St. Kilda.

Anderson, Margaret Hodge, M.B., B.S. (Melb.), 1920, Hobson Street, Hawthorn.

Anderson, Noel Alexander Lewis, M.B., B.S. (Melb.), 1920, "St. Ann's," Commercial Road, Melbourne.

Butchart, Russell Exon, M.B., B.S. (Melb.), 1920, 55 Westbury Street, East St. Kilda.

Cuttle, Ronald, M.B., B.S. (Melb.), 1920, Ultima.

De Ravin, John Victor Hugo, M.B., B.S. (Melb.), 1920, c/o. S. M. De Ravin, "Welwyn," Selbourne Road, Toorak.

Jackson, Frederick William, M.B., B.S. (Melb.), 1920, 31 Normanby Street, Middle Brighton.

Kennan, Winifred Edith, M.B., B.S. (Melb.), 1920, 67 Lisson Grove, Hawthorn.

Kincaid, Hilda Estelle, M.B., B.S. (Melb.), 1920, 17 Kinkora Road, Hawthorn.

Long, William Hellier, M.B., B.S. (Melb.), 1920, 69 Balwyn Road, Canterbury.

McLelland, William Edward, M.B., B.S. (Melb.), 1920, Mount Pleasant, Houghton, Johannesburg, South Africa.
O'Hara, Joseph Patrick, M.B., B.S. (Melb.), 1920, 186 Park Street, South Melbourne.
Quin, Bernard Haselden, M.B., B.S. (Melb.), 1920, "Woodcote," High Street, Malvern.
Sutherland, Charles Evander Vass, M.B., B.S. (Melb.), 1920, "Novar," Dandenong.
Tighe, Thomas Patrick, M.B., B.S. (Melb.), 1920, 111 Milton Street, St. Kilda.
Wood, Carlyle Sandford, M.B., B.S. (Melb.), 1920, 47 Waterfield Street, Coburg.
Zimmer, Harold Newton, M.B., B.S. (Melb.), 1920, Wellington Street, Maryborough.

Medical Appointments.

It is announced that Dr. R. W. Cilento has been appointed Demonstrator in Anatomy at the School of Anatomy of the University of Adelaide.

The appointment of Dr. F. C. Thompson (B.M.A.) as Officer of Health by the Maylands Local Board of Health, of Western Australia, has been approved.

Dr. Richard P. Hill (B.M.A.), who has satisfactorily served a probationary period of twelve months, has been appointed Second Assistant Medical Superintendent to the Hospital for the Insane at Goodna, Queensland. The appointment dates from March 20, 1920.

In pursuance of the provisions of *The Health Acts 1900 to 1917*, Dr. Graham P. Dixon (B.M.A.) has been appointed a member of the Nurses' Registration Board of Queensland.

Dr. L. J. Tassie (B.M.A.) has been appointed Deputy Quarantine Officer at Port Pirie, South Australia.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, locum tenentes sought, etc., see "Advertiser," page xxiii.

University of Sydney: Lecturer in Obstetrics.

Department of Public Health, Queensland: Health Officer.

Renwick Hospital for Infants: Honorary Masseuse.

Australasian Massage Association: Six Lecturers.

Medical Appointments.

IMPORTANT NOTICE.

Medical practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, 429 Strand, London, W.C.

Branch.	APPOINTMENTS.
VICTORIA. (Hon. Sec., Medical Society Hall, East Melbourne.)	All Friendly Society Lodges (other than the Grand United Order of Oddfellows and the Melbourne Tramways Mutual Benefit Society), Institutes, Medical Dispensaries and other Contract Practice. Australian Prudential Association Proprietary, Limited. Mutual National Provident Club. National Provident Association.
QUEENSLAND. (Hon. Sec., B.M.A. Building, Adelaide Street, Brisbane.)	Australian Natives' Association. Brisbane United Friendly Society Institute. Cloncurry Hospital. Stannary Hills Hospital.
SOUTH AUSTRALIA. (Hon. Sec., 3 North Terrace, Adelaide.)	Contract Practice Appointments at Renmark. Contract Practice Appointments in South Australia.
WESTERN AUSTRALIA. (Hon. Sec., 6 Bank of New South Wales Chambers, St. George's Terrace, Perth.)	All Contract Practice Appointments in Western Australia.
NEW SOUTH WALES. (Hon. Sec., 30.-34 Elizabeth Street, Sydney.)	Australian Natives' Association. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham Dispensary. Manchester Unity Oddfellows' Medical Institute, Elizabeth Street, Sydney. Marrickville United Friendly Societies' Dispensary. North Sydney United Friendly Societies. People's Prudential Benefit Society. Phœnix Mutual Provident Society.
NEW ZEALAND: WELLINGTON DIVISION. (Hon. Sec., Wellington.)	Friendly Society Lodges, Wellington, New Zealand.

Diary for the Month.

May 11.—Tas. Branch, B.M.A..
May 11.—N.S.W. Branch, B.M.A., Ethics Committee.
May 13.—Vic. Branch, B.M.A., Council; Election of Representative on Representative Body.
May 13.—Q. Branch, B.M.A., Council.
May 14.—N.S.W. Branch, B.M.A., Clinical.
May 14.—S. Aust. Branch, B.M.A., Council.
May 18.—N.S.W. Branch, B.M.A., Executive and Finance Committee.
May 18.—Illawarra Suburbs Med. Assoc. (N.S.W.).
May 19.—W. Aust. Branch, B.M.A..
May 20.—The City Medical Association (Sydney).
May 25.—N.S.W. Branch, B.M.A., Medical Politics Committee; Organization and Science Committee.
May 26.—Vic. Branch, B.M.A., Council.
May 27.—S. Aust. Branch, B.M.A..
May 27.—Q. Branch, B.M.A., Council.
May 28.—N.S.W. Branch, B.M.A..
June 2.—Vic. Branch, B.M.A..
June 4.—Q. Branch, B.M.A..
June 8.—Tas. Branch, B.M.A..
June 8.—N.S.W. Branch, B.M.A., Ethics Committee.
June 10.—Vic. Branch, B.M.A., Council.

EDITORIAL NOTICES.

Manuscripts forwarded to the office of this journal cannot under any circumstances be returned.

Original articles forwarded for publication are understood to be offered to *The Medical Journal of Australia* alone, unless the contrary be stated.

All communications should be addressed to "The Editor," *The Medical Journal of Australia*, B.M.A. Building, 30-34 Elizabeth Street, Sydney. (Telephone: City 2645.)